

# **FA-M3 ToolBox for Temperature Control and Monitoring Modules**

IM 34M06Q31-02E

**vigilantplant.**

## **Compatible Modules:**

Model Code	Model Name
F3CU04-0□	Temperature Control and PID Module
F3CU04-1□	Temperature Control and PID Module
F3CX04-0□	Temperature Monitoring Module



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# Applicable Product:

## Range-Free Multi-Controller FA-M3

- Model Code: SF661-MCW
- Model Name: FA-M3 ToolBox for Temperature Control and Monitoring Modules

The document number for this manual is given below.

Refer to the document number in all communications, including when purchasing additional copies of this manual.

- Document Number: IM 34M06Q31-02E

# Important

## ■ About This Manual

- This Manual should be passed on to the end user.
- Before using the controller, read this manual thoroughly to have a clear understanding of the controller.
- This manual explains the functions of this product, but there is no guarantee that they will suit the particular purpose of the user.
- Under absolutely no circumstances may the contents of this manual be transcribed or copied, in part or in whole, without permission.
- The contents of this manual are subject to change without prior notice.
- Every effort has been made to ensure accuracy in the preparation of this manual. However, should any errors or omissions come to the attention of the user, please contact the nearest Yokogawa Electric representative or sales office.

## ■ Safety symbols



- **Danger.** This symbol on the product indicates that the operator must follow the instructions laid out in this user's manual to avoid the risk of personnel injuries, fatalities, or damage to the instrument. Where indicated by this symbol, the manual describes what special care the operator must exercise to prevent electrical shock or other dangers that may result in injury or the loss of life.



- **Protective Conductor Terminal**  
This terminal is to prevent electric shock. Before using the instrument, connect to the Protective earth (Comply with the regulation of each country.), and route the line through the shortest path possible.



- **Functional Earth Terminal**  
This terminal is for stable operation. Before using the instrument, be sure to ground this terminal.



- **Alternating current.** Indicates alternating current.



- **Direct current.** Indicates direct current.

The following symbols are used only in the user's manual.



### **WARNING**

- Indicates a "Warning".
- Draws attention to information essential to prevent hardware damage, software damage or system failure.



### **CAUTION**

- Indicates a "Caution".
- Draws attention to information essential to the understanding of operation and functions.

### **TIP**

- Indicates a "TIP".
- Gives information that complements the present topic.

### **SEE ALSO**

- Indicates a "SEE ALSO" reference.
- Identifies a source to which to refer.

## ■ Safety Precautions when Using/Maintaining the Product

- For the protection and safe use of the product and the system controlled by it, be sure to follow the instructions and precautions on safety stated in this manual whenever handling the product. Take special note that if you handle the product in a manner other than prescribed in these instructions, the protection feature of the product may be damaged or impaired. In such cases, Yokogawa cannot guarantee the quality, performance, function and safety of the product.
- When installing protection and/or safety circuits such as lightning protection devices and equipment for the product and control system as well as designing or installing separate protection and/or safety circuits for fool-proof design and fail-safe design of processes and lines using the product and the system controlled by it, the user should implement it using devices and equipment, additional to this product.
- If component parts or consumable are to be replaced, be sure to use parts specified by the company.
- This product is not designed or manufactured to be used in critical applications which directly affect or threaten human lives and safety — such as nuclear power equipment, devices using radioactivity, railway facilities, aviation equipment, shipboard equipment, aviation facilities or medical equipment. If so used, it is the user's responsibility to include in the system additional equipment and devices that ensure personnel safety.
- Do not attempt to modify the product.
- To avoid electrical shock, turn off the power before wiring.
- This product is classified as Class A for use in industrial environments. If used in a residential environment, it may cause electromagnetic interference (EMI).

In such situations, it is the user's responsibility to adopt the necessary measures against EMI.

## ■ Exemption from Responsibility

- Yokogawa Electric Corporation (hereinafter simply referred to as Yokogawa Electric) makes no warranties regarding the product except those stated in the WARRANTY that is provided separately.
- Yokogawa Electric assumes no liability to any party for any loss or damage, direct or indirect, caused by the use or any unpredictable defect of the product.

## ■ Software Supplied by the Company

- Yokogawa Electric makes no other warranties expressed or implied except as provided in its warranty clause for software supplied by the company.
- Use the software with one computer only. You must purchase another copy of the software for use with each additional computer.
- Copying the software for any purposes other than backup is strictly prohibited.
- Store the original media that contain the software in a safe place.
- Reverse engineering, such as decompiling of the software, is strictly prohibited.
- Under absolutely no circumstances may the software supplied by Yokogawa Electric be transferred, exchanged, or sublet or leased, in part or as a whole, for use by any third party without prior permission by Yokogawa Electric.

## ■ General Requirements for Using the FA-M3 Controller

### ● Set the product in a location that fulfills the following requirements:

- Where the product will not be exposed to direct sunlight, and where the operating surrounding air temperature is from 0°C to 55°C (32°F to 131°F).  
There are modules that must be used in an environment where the operating surrounding air temperature is in a range smaller than 0°C to 55°C (32°F to 131°F). Refer to hardware user's manual or the applicable user's manual. In case of attaching such a module, the entire system's operating surrounding air temperature is limited to the module's individual operating surrounding air temperature.
- Where the relative humidity is from 10 to 90%.  
In places where there is a chance of condensation, use a space heater or the like to constantly keep the product warm and prevent condensation.
- For use in Pollution Degree 2 Environment.
- Where there are no corrosive or flammable gases.
- Where the product will not be exposed to mechanical vibration or shock that exceed specifications.
- Where there is no chance the product may be exposed to radioactivity.

### ● Use the correct types of wire for external wiring:

- USE COPPER CONDUCTORS ONLY.
- Use conductors with temperature rating above 75°C.

### ● Securely tighten screws:

- Securely tighten module mounting screws and terminal screws to avoid problems such as faulty operation.
- Tighten terminal block screws with the correct tightening torque as given in this manual. Refer to the hardware user's manual or the applicable user's manual for the appropriate tightening torque.

### ● Securely lock connecting cables:

- Securely lock the connectors of cables, and check them thoroughly before turning on the power.

### ● Interlock with emergency-stop circuitry using external relays:

- Equipment incorporating the FA-M3 controller must be furnished with emergency-stop circuitry that uses external relays. This circuitry should be set up to interlock correctly with controller status (stop/run).

### ● Ground for low impedance:

- For safety reasons, connect the [FG] grounding terminal to a protective earth (Comply with the regulation of each country.). For compliance to CE Marking, use braided or other wires that can ensure low impedance even at high frequencies for grounding.

### ● Configure and route cables with noise control considerations:

- Perform installation and wiring that segregates system parts that may likely become noise sources and system parts that are susceptible to noise. Segregation can be achieved by measures such as segregating by distance, installing a filter or segregating the grounding system.

**● Configure for CE Marking Conformance:**

- For compliance to CE Marking, perform installation and cable routing according to the description on compliance to CE Marking in the "Hardware Manual" (IM 34M06C11-01E).

**● Keep spare parts on hand:**

- We recommend that you stock up on maintenance parts, including spare modules, in advance.
- Preventive maintenance (replacement of the module) is required for using the module beyond 10 years.

**● Discharge static electricity before touching the system:**

- Because static charge can accumulate in dry conditions, first touch grounded metal to discharge any static electricity before touching the system.

**● Wipe off dirt with a soft cloth:**

- Gently wipe off dirt on the product's surfaces with a soft cloth.
- If you soak the cloth in water or a neutral detergent, tightly wring it out before wiping the product. Letting water enter the module interior can cause malfunctions.
- Do not use volatile solvents such as benzine or paint thinner or chemicals for cleaning, as they may cause deformity, discoloration, or malfunctioning.

**● Avoid storing the FA-M3 controller in places with high temperature or humidity:**

- Since the CPU module has a built-in battery, avoid storage in places with high temperature or humidity.
- Since the service life of the battery is drastically reduced by exposure to high temperatures, take special care (storage surrounding air temperature should be from -20°C to 75°C).
- There is a built-in lithium battery in a CPU module which serves as backup power supply for programs, device information and configuration information.

The service life of this battery is more than 10 years in standby mode at room temperature. Take note that the service life of the battery may be shortened when installed or stored at locations of extreme low or high temperatures. Therefore, we recommend that modules with built-in batteries be stored at room temperature.

**● Always turn off the power before installing or removing modules:**

- Failing to turn off the power supply when installing or removing modules, may result in damage.

**● Do not touch components in the module:**

- In some modules you can remove the right-side cover and install ROM packs or change switch settings. While doing this, do not touch any components on the printed-circuit board, otherwise components may be damaged and modules may fail to work.

**● Do not use unused terminals:**

- Do not connect wires to unused terminals on a terminal block or in a connector. Doing so may adversely affect the functions of the module.



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● **Use the following power source:**

- Use only F3PU□□-□□ as the power supply module.
- If using this product as a UL-approved product, for the external power supply, use a limited voltage / current circuit power source or a Class 2 power source.

● **Refer to the user's manual before connecting wires:**

- Refer to the hardware user's manual or the applicable user's manual for the external wiring drawing.
- Refer to "A3.6.5 Connecting Output Devices" in the hardware user's manual before connecting the wiring for the output signal.
- Refer to "A3.5.4 Grounding Procedure" in the hardware user's manual for attaching the grounding wiring.

## ■ Waste Electrical and Electronic Equipment(WEEE)



### Waste Electrical and Electronic Equipment (WEEE)

(This directive is only valid in the EU.)

This product complies with the WEEE Directive marking requirement.

The following marking indicates that you must not discard this electrical/electronic product in domestic household waste.

#### Product Category

With reference to the equipment types in the WEEE directive Annex 1, this product is classified as a "Monitoring and Control instrumentation" product.

Do not dispose in domestic household waste.

When disposing products in the EU, contact your local Yokogawa Europe B. V. office.

## ■ How to dispose the batteries

This is an explanation about the new EU Battery Directive(DIRECTIVE2006/66/EC). This directive is only valid in the EU.

Batteries are included in some modules of this product. The procedure is different when the user can remove or cannot remove.

#### ①Batteries the user can remove

The battery of F3RP6□ can be removed by yourself.

When you remove the battery from F3RP6□ and dispose it, discard them in accordance with domestic law concerning disposal. See the User's Manual of F3RP6□ for the removal procedure. Take a right action on waste batteries, because the collection system in the EU on waste batteries are regulated. If you don't remove the battery from this product, please see ②.

#### ②Batteries the user cannot remove

Dispose the battery together with this product.

When you dispose this product in the EU, contact your local Yokogawa Europe B.V.office.

Do not dispose them as domestic household waste.

Battery category: Lithium battery



Note: With reference to Annex II of the new Battery Directive 2006/66/EC, the above symbol indicates obligatory separate collection.

# Introduction

## ■ Overview of the Manual

This user's manual is for the FA-M3 ToolBox for Temperature Control and Monitoring Modules (simply ToolBox in this manual). It describes how to set up parameters of the monitor and debug the temperature control and monitoring modules, perform operation tests, as well as monitor and debug the modules.

For enquiries, please contact the store where you purchased the product or the nearest Yokogawa sales offices listed at the back of this manual.

We recommend using this manual together with the operation manuals of your computer or printer, as required.

## ■ Structure of the Manual

This manual consists of three parts: A, B and C.

### ● Part A: Startup Manual

The ToolBox software must be installed on a personal computer before it can be executed on the computer. Part A describes how to install the ToolBox software on a personal computer and how to use the online manual and connect the personal computer to the FA-M3.

### ● Part B: Operation Manual

Part B describes how to edit a project with ToolBox. In particular, it describes how to set up the parameters of the temperature control and monitoring modules, tune registered parameters while operating the modules, and download projects to or upload projects from the modules.

### ● Part C: Reference Guide

Part C lists certain limitations of ToolBox and describes each registered parameter.

## ■ How to Read this Manual

Be sure to read the “Introduction” and “How to Read this Manual” section of this manual, as well as the “FA-M3 ToolBox Manual” carefully before using ToolBox.

This manual is structured so that each chapter or section in Part A and Part B can be read independently to understand the basic specifications of ToolBox.

This manual describes only the functions of ToolBox that are specific to temperature control and monitoring modules. For information on basic operations and general editing functions of ToolBox, applicable to other advanced-function modules, see the FA-M3 ToolBox Manual.

### **TIP**

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The term “ToolBox” as used in this manual, unless otherwise stated, refers to the FA-M3 ToolBox for Temperature Control and Monitoring Modules, while the term “ToolBox” or “setup tool” as used in the FA-M3 ToolBox Manual refers to FA-M3 ToolBox.

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## ■ Notation

### ● Notation for Windows Screens and Operation

Items in initial Caps denote symbols, names and window names.

Example: ToolBox, Local Device

Bracketed items denote menu bar items, dialog box fields, commands, and buttons.

Example: Select [File]–[New] from the menu bar.

This means to click [File] on the menu bar, followed by [New] on the pull-down menu.

### ● Representations in ToolBox Figures and Screens

The screen examples given in this manual essentially assumes a Windows XP operating environment.

Icons and application names may differ in other windows operating environments such as Windows 2000, Windows Vista and Windows 7.

Some figures in this manual may, for reasons of convenience, be emphasized or simplified, or parts of it may be omitted. Some screen images in this manual may differ from actual screens due to differences in the operating machine environment.

### ● Function Keys and Shortcut Keys

In addition to using a mouse, you can operate the ToolBox menus using function keys and shortcut keys.

### **SEE ALSO**

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For information on the function and shortcut keys, see Section B.1.3, “ToolBox Operation Commands,” of the FA-M3 ToolBox Manual.

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## ■ Other Instruction Manuals

For individual sequence CPU modules, please refer to the relevant instruction manuals. These manuals are available separately.

### ● For information on functions of sequence CPU modules, refer to:

Document Name	Document Number
Sequence CPU – Functions (for F3SP28-3N/3S, F3SP38-6N/6S, F3SP53-4H/4S, F3SP58-6H/6S, F3SP59-7S)	IM34M06P13-01E
Sequence CPU – Functions (for F3SP66-4S, F3SP67-6S)	IM34M06P14-01E
Sequence CPU – Network Functions (for F3SP66-4S, F3SP67-6S)	IM34M06P14-02E
Sequence CPU – Functions (for F3SP71-4N/4S, F3SP76-7N/7S)	IM34M06P15-01E
Sequence CPU – Network Functions (for F3SP71-4N/4S, F3SP76-7N/7S)	IM34M06P15-02E
Sequence CPU Modules – Functions (for F3SP21, F3SP25 and F3SP35)	IM34M06P12-02E

### ● For information on instructions of sequence CPU modules, refer to:

Document Name	Document Number
Sequence CPU – Instructions	IM34M06P12-03E

### ● For information on the Temperature Control and Monitoring Modules:

ToolBox is designed for use with the following temperature control and monitoring modules:

Module Code	Document Name	Document Number
F3CU04-0N	Temperature Control and PID Module	IM34M06H62-01E
F3CU04-1N	Temperature Control and PID Module	
F3CU04-0S	Temperature Control and PID Module	IM34M06H62-02E
F3CU04-1S		
F3CU04-0G	Temperature Control and PID Module	IM34M06H62-02E-T01
F3CU04-1G		
F3CX04-0N	Temperature Monitoring Module	IM34M06H63-01E
F3CX04-0G	Temperature Monitoring Module	IM34M06H63-01E-T01

### ● For the FA-M3 specifications and configurations\*<sup>1</sup>, installation and wiring, test run, maintenance, and module installation limits for the whole system:

\*1: Refer to the relevant product manuals for specifications except for power supply modules, base modules, input/output modules, cables and terminal units.

Document Name	Document Number
Hardware Manual	IM34M06C11-01E

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## ■ Trademarks

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# FA-M3 ToolBox for Temperature Control and Monitoring Modules

IM 34M06Q31-02E 6th Edition

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# A1 Product Overview

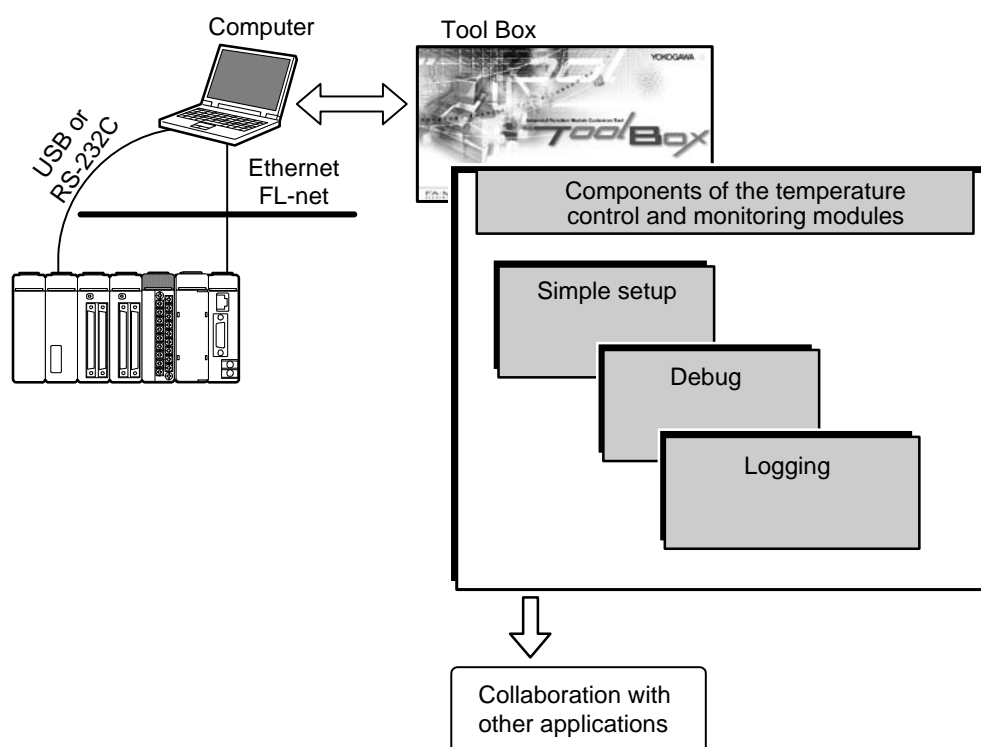
This chapter describes the outline and features of the FA-M3 ToolBox for Temperature Control and Monitoring Modules (or simply referred to as ToolBox in this manual).

## A1.1 Overview and Features

### □ Overview

ToolBox is a tool for performing setup of temperature control and monitoring modules. You can use it to set up or change the parameters of these modules, or to perform action test and monitoring on the modules.

You can run ToolBox and the WideField3 ladder program development tool concurrently.



### □ Features

ToolBox has the following features:

- **User Friendly, Easy Setup**

You can easily set up the registered parameters of the temperature control and monitoring modules using ToolBox's user-friendly parameter input method.

- **Advanced Debugging Functions**

Two types of debugging functions (action tests) are available: parameter adjustment and tuning. The parameter adjustment function allows for online modification of each registered parameter. The tuning function allows online fine-adjustment (or tuning) of the registered parameters for a specific loop of a temperature control or monitoring module while monitoring the behavior of that loop.



### CAUTION

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While these action test functions can be used to continuously modify the parameters or monitor the behavior of a running module, they are really designed for initial module setup. As such, they are not guaranteed to function properly as an operation panel for continuous process monitoring.

---

- **Data Logging**

- You can specify to save data of selected registered parameters or CPU registers in a file as log data. Using ToolBox, you can display saved log data as graphs to allow a better grasp of the operation condition of the temperature control and monitoring modules.
- Data may be automatically saved at specified intervals even while data logging is in progress.
- You can also monitor data of CPU devices (data registers or file registers).



### CAUTION

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Although the action monitor function can be used to continuously sample data from a module, it is really designed for data sampling during initial module setup. As such, it is not guaranteed to function as a recorder for continuous process monitoring.

---

- **Collaboration with Other Applications**

- You can run ToolBox and the WideField3 ladder program development tool concurrently on the same computer to edit module parameters and programs at the same time, as ToolBox and WideField3 can communicate with modules independently.
- You can prepare registered parameters with ToolBox and save them as CSV-formatted files so that the data can be incorporated into Microsoft Excel documents.

- **Transferring Registered Parameters to CPU Module**

You can prepare registered parameters with ToolBox and transfer them to the data (file) registers of the CPU module collectively so that the data can be used by a ladder program running in the CPU module.

## A1.2 New and Updated Functions

### A1.2.1 Differences between ToolBox R2 and ToolBox R1

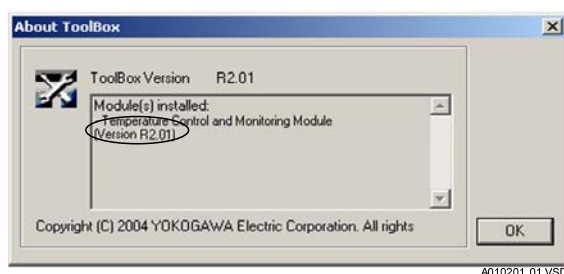
This subsection describes differences in functions between ToolBox R2 and ToolBox R1.

#### SEE ALSO

For details of individual functional differences, see sections given in the “See Also” column in Table A1.1.

#### TIP

To confirm the software version of ToolBox R2, select [Help]-[About ToolBox] from the menu bar. A dialog box as shown below appears (the screen capture will be in Japanese as there is no English version for ToolBox R2). Verify that the version is displayed as “R2.xx”. The version of ToolBox is determined by the version of the module installed.



**Table A1.1 New and Updated Functions in ToolBox R2**

Category	Function Details	Summary	See Also
Tuning	Modified loop selection operation	On the Tuning screen, a loop can be selected from a list.	B5.2 Action Test Tuning
Screen display	Action progress display	Progress display during time-consuming communications processing	—

## A1.2.2 Differences between ToolBox R3 and ToolBox R2

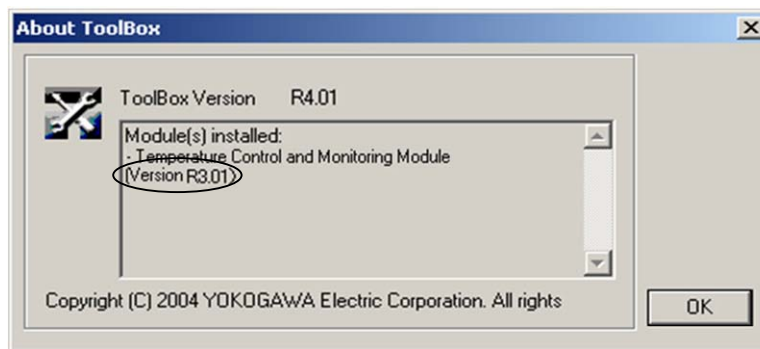
This subsection describes differences in functions between ToolBox R3 and ToolBox R2.

### SEE ALSO

For details of individual functional differences, see sections given in the “See Also” column in Table A1.2.

### TIP

To confirm the software version of ToolBox R3, select [Help]-[About ToolBox] from the menu bar. A dialog box as shown below appears. Verify that the version is displayed as “R3.xx”. The version of ToolBox is determined by the version of the module installed.



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**Table A1.2 New and Updated Functions in ToolBox R3**

Category	Function Details	Summary	See Also
CPU	New sequence CPU types	New sequence CPU types are added, together with their specific functions.	A2.2 Operating Environment for ToolBox B1.1.1 Screen Layout
Online	USB communication	Allows connection of ToolBox to FA-M3 using USB, with support of all the same functions available when connected using other communications medium.	A2.2 Operating Environment for ToolBox A2.4 Connecting ToolBox and FA-M3 System
Parameter edit	Items Setup	A button is added to the parameter edit window for opening a screen to select the parameter items to be displayed in simple setup view.	
Parameter adjustment	Background color	The background color of parameter adjustment screens are changed to light yellow to distinguish them from online screens	
Action monitor	Support for CPU device	CPU devices (D, B) can be monitored on Action Monitor screens.	B4 Checking FA-M3 Operation Using Action Monitor
	Specify scale for graph display	Scale range can be specified for graphs to be displayed on monitor screens.	
	Zoom display	Display on Action Monitor screens can be enlarged or reduced.	
	ToolTip support	Monitored objects can be checked using ToolTip.	

## A1.2.3 Differences between ToolBox R4 and ToolBox R3

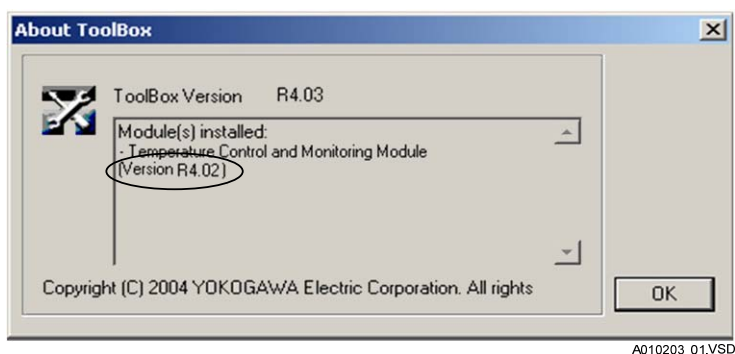
This subsection describes differences in functions between ToolBox R4 and ToolBox R3.

### SEE ALSO

For details of individual functional differences, see sections given in the “See Also” column in Table A1.3.

### TIP

To confirm the software version of ToolBox R4, select [Help]-[About ToolBox] from the menu bar. A dialog box as shown below appears. Verify that the version is displayed as “R4.xx”. The version of ToolBox is determined by the version of the module installed.



**Table A1.3 New and Updated Functions in ToolBox R4**

Category	Function Details	Summary	See Also
CPU	Added CPU modules that support the temperature control and PID module	The following CPU modules are added: - F3CU04-0S - F3CU04-1S In addition, the SP backup function for the above modules is supported.	A2.2 Operating Environment for ToolBox B1.1.1 Screen Layout
Module type change	Function for changing the module type	A function is added for changing the module type specified in a registered parameter file.	A2.2 Operating Environment for ToolBox A2.4 Connecting ToolBox and FA-M3 System
Tuning	Added alarm lamp	The “parameter error” alarm lamp is separated into “Controller or I/O parameter error” and “Operation parameter error”.	B5.2.6 Checking for Error or Alarm Conditions
	Monitoring the number of write operations to the EEPROM	A counter value for the number of write operations to the EEPROM is displayed on the error status confirmation dialog.	B5.2.6 Checking for Error or Alarm Conditions
Operating environment	Windows Vista support	Windows Vista support is included in the operating environment.	

# A1.2.4 Differences between ToolBox R5 and ToolBox R4

This subsection describes differences in functions between ToolBox R5 and ToolBox R4.

## SEE ALSO

For details of individual functional differences, see sections given in the “See Also” column in Table A1.4.

## TIP

To confirm the software version of ToolBox R5, select [Help]-[About ToolBox] from the menu bar. A dialog box as shown below appears. Verify that the version is displayed as “R5.xx”. The version of ToolBox is determined by the version of the module installed.

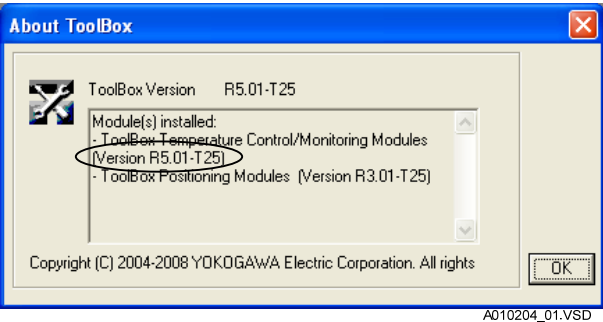


Table A1.4 New and Updated Functions in ToolBox R5

Category	Function Details	Summary	See Also
CPU	Addition of sequence CPU modules	The following sequence CPU modules are added: - F3SP71-4N - F3SP76-7N - F3SP22-0S And, functions specific to the additional modules are supported.	
Operating environment	Windows 7 support	Windows 7 support is included in the operating environment.	
Online	Multiple port connections	Allows for simultaneous operation of multiple ToolBox applications connected online to FA-M3 CPU modules.	



## A1.2.5 Differences between ToolBox R6 and ToolBox R5

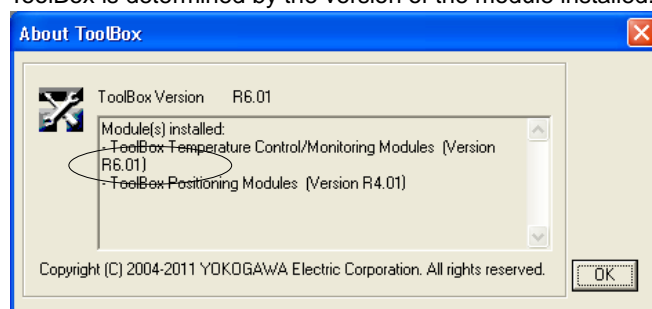
This subsection describes differences in functions between ToolBox R6 and ToolBox R5.

### SEE ALSO

For details of individual functional differences, see sections given in the “See Also” column in Table A1.5.

### TIP

To confirm the software version of ToolBox R6, select [Help]-[About ToolBox] from the menu bar. A dialog box as shown below appears. Verify that the version is displayed as “R6.xx”. The version of ToolBox is determined by the version of the module installed.



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**Table A1.5 New and Updated Functions in ToolBox R6**

Category	Function Details	Summary	See Also
<b>ToolBoxR6.01</b>			
Entire functions	Language selection	Allows you to select the language mode of Toolbox.	
CPU	Addition of sequence CPU modules	The following sequence CPU modules are added: - F3SP71-4S - F3SP76-7S	
<b>ToolBoxR6.02</b>			
Operating environment	Windows Vista(64bit), Windows 7(64bit) support	Windows Vista (64bit) and Windows 7 (64bit) support is included in the operating environment.	

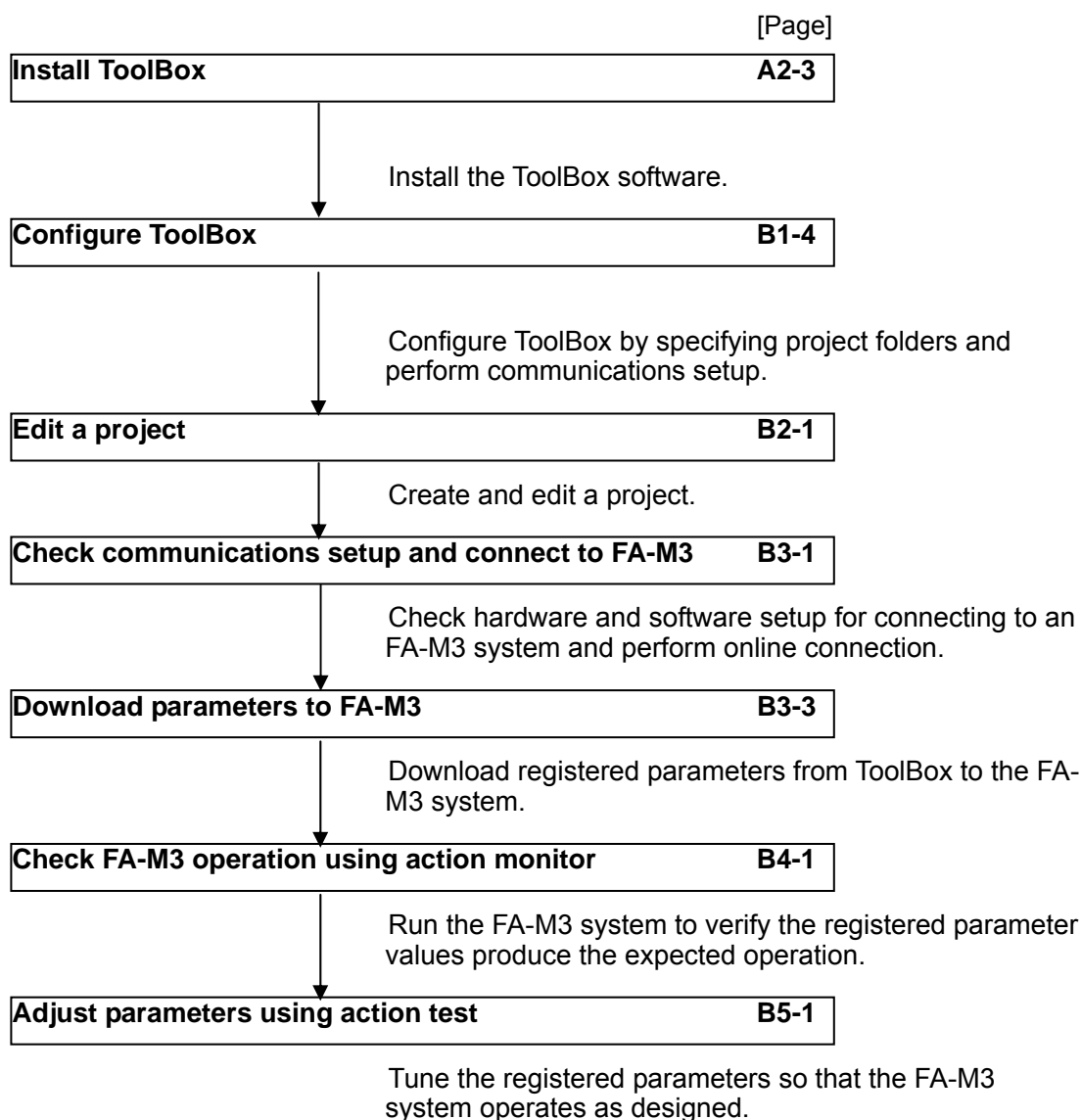


## A2 Installing ToolBox

This chapter describes how to install, run and stop the FA-M3 ToolBox for Temperature Control and Monitoring Modules (or simply referred to as ToolBox in this manual).

- Procedure for Using ToolBox → A2.1
- Operating Environment for ToolBox → A2.2
- Installing ToolBox → A2.3
- Connecting ToolBox and FA-M3 System → A2.4

### A2.1 Procedure for Using ToolBox



## A2.2 Operating Environment for ToolBox

### □ Operating Environment

The operating environment for ToolBox is shown below.

**Table A2.1 Operating Environment**

Item	Specifications
PC	PC/AT compatible
OS <sup>*1</sup>	Microsoft® Windows® 7 (32bit/64bit) Microsoft® Windows® Vista(32bit/64bit) Microsoft® Windows® XP Microsoft® Windows® 2000 Professional
Required applications	Internet Explorer 5.01 or higher
CPU <sup>*2</sup>	Pentium 133MHz or faster, adequate for the operating system to run properly.
Memory <sup>*3</sup>	32MB or more, adequate for the operating system to run properly.
Hard disk capacity	200 MB or more available
Display	800×600 dots or more (1024×768 recommended)
Communications <sup>*4*5</sup>	USB, RS-232C, Ethernet, FL-net
Printer	Any printer compatible with the operating systems listed above and supports A4 printing
Compatible advanced-function modules	FA-M3 Temperature Control and PID Modules F3CU04-0S, F3CU04-0N, F3CU04-1S, F3CU04-1N, F3CU04-0G and F3CU04-1G FA-M3 Temperature Monitoring Module F3CX04-0N, F3CX04-0G
Compatible CPU modules	F3SP05-0P, F3SP08-0P, F3SP08-SP, F3SP21-0N, F3SP25-2N, F3SP35-2N, F3SP28-3N, F3SP38-6N, F3SP53-4H, F3SP58-6H, F3SP22-0S, F3SP28-3S, F3SP38-6S, F3SP53-4S, F3SP58-6S, F3SP59-7S, F3SPV3-4H, F3SPV8-6H, F3FP36-3N, F3SP66-4S, F3SP67-6S, F3SP71-4N, F3SP76-7N, F3SP71-4S, F3SP76-7S

\*1: ToolBox only supports the 32-bit (x86) version but not the 64-bit (x64) version of the Windows XP operating system.

\*2: For FL-net communications, CPU speed must be Pentium III 750 MHz or higher.

\*3: For FL-net communications, memory must be 128MB or more.

\*4: For FL-net communications, network card must support TCP/IP protocol.

Usable communications conditions vary with CPU type.

\*5: Depending on the chipset used by the PC running the ToolBox software, reliable USB connection is not always guaranteed.

## A2.3 Installing ToolBox

This section describes how to install ToolBox. Check the following precautions before installation.



### CAUTION

Log in with system administrator (Administrator) privileges before performing ToolBox setup, maintenance or deletion. These ToolBox operations cannot be performed by a user without Administrator privileges.

In addition, select [Run as administrator] when executing the installer program in Windows Vista/Windows 7. Installation cannot proceed without Administrator privileges.



### CAUTION

In Windows Vista/Windows 7, if UAC is enabled, the installer program in the product CD-ROM may be blocked, and cannot be automatically executed.

In this case, select "Setup.exe" in the CD-ROM using Explorer or some other means and start the installer using [Run as administrator].

### TIP

The details of the installation procedure may depend on the OS. We describe here how to set up on Windows XP as an example.

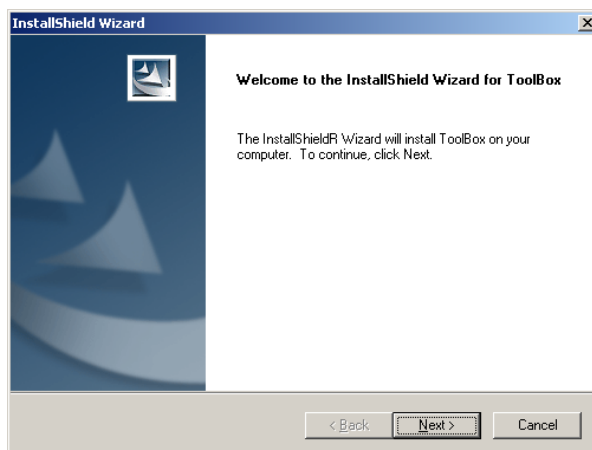
1. Insert the ToolBox CD-ROM into the CD-ROM drive of the personal computer where ToolBox is to be installed.

⇒ Either screen (1) or (2) will be displayed.  
Screen (1): ToolBox is not installed.  
Screen (2): The ToolBox for Temperature Control and Monitoring Modules component is already installed. Select Modify to add components.

### TIP

If another ToolBox component is already installed on the PC, add the Temperature Control and Monitoring Modules component to the existing ToolBox installation.

In this case, you cannot specify a different installation folder.

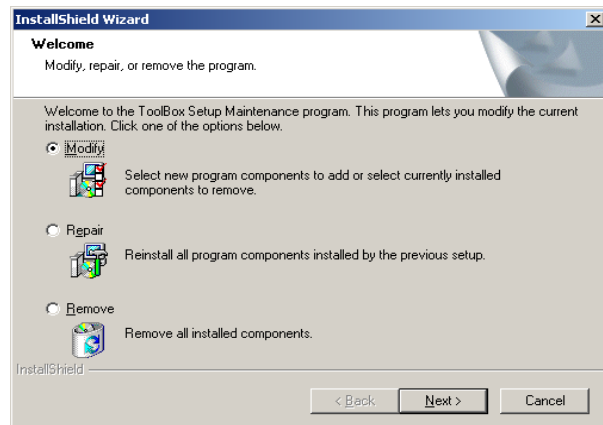


Screen (1)

2. Proceed with installation according to the instructions displayed.

### SEE ALSO

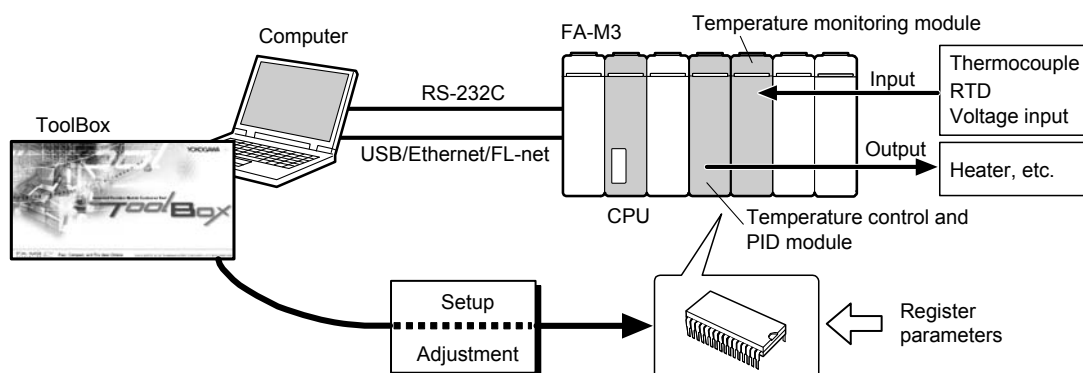
For details on the installation procedure, see Section A2.3, “Installing and Uninstalling ToolBox” of the FA-M3 ToolBox Manual.



Screen (2)

## A2.4 Connecting ToolBox and FA-M3 System

### □ System Environment When Using ToolBox







# B1 Using ToolBox

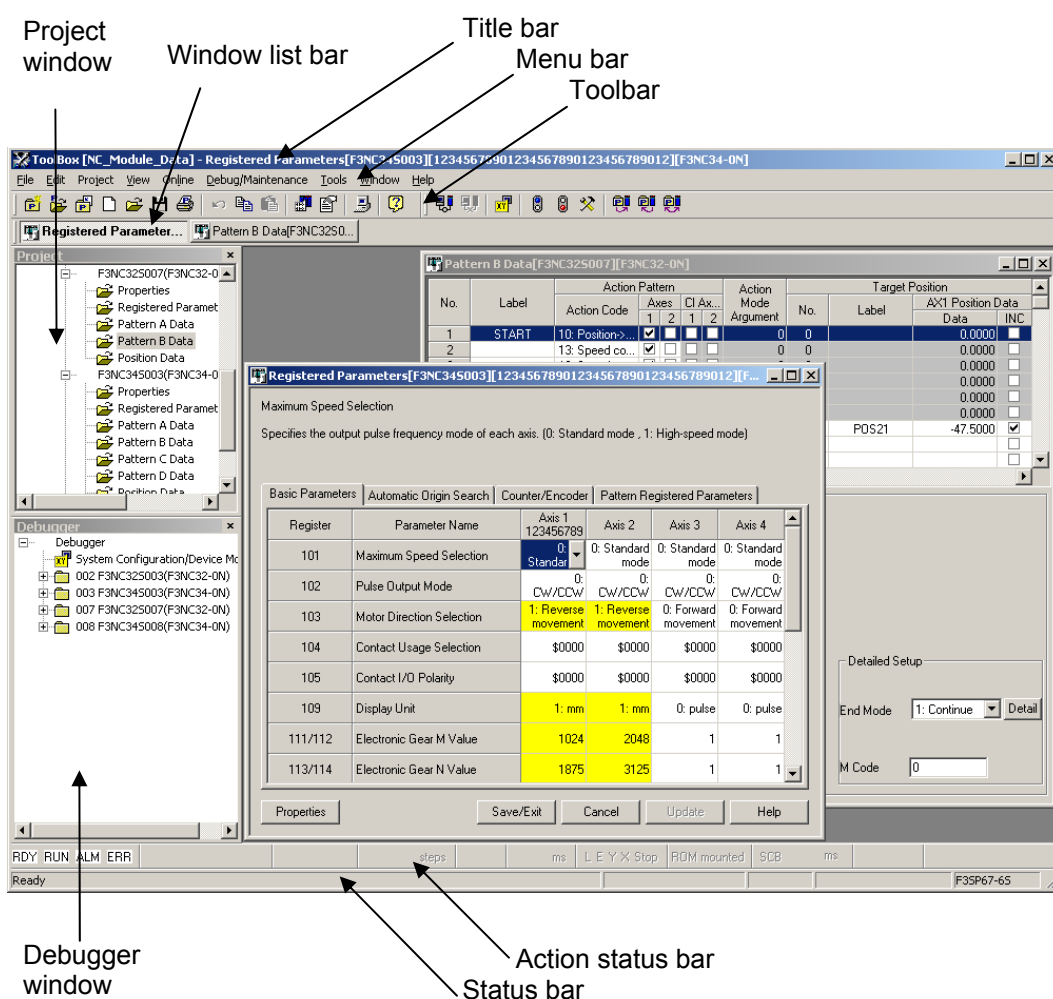
This chapter describes what a user must know before using the FA-M3 ToolBox for Temperature Control and Monitoring Modules (or simply referred to as ToolBox in this manual).

- ToolBox Operation Screen → B1.1
- Configuring ToolBox → B1.2

## B1.1 ToolBox Operation Screen

### B1.1.1 Screen Layout

The ToolBox operation screen consists of the following components. The screen layout and operation are similar to those of Windows.



- **Title Bar**

The title bar displays the name of the open project, the name of the active window and the name of the file being edited.

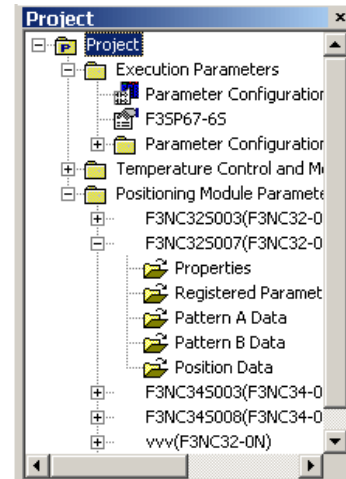
- **Menu Bar**

The menu bar displays the standard menus of ToolBox. Clicking each item on the menu bar displays a pull-down menu, from which available commands can be selected for execution. The set of enabled (available) commands at any point depends on the current CPU operating mode and the action mode. Disabled commands are grayed out in the display.



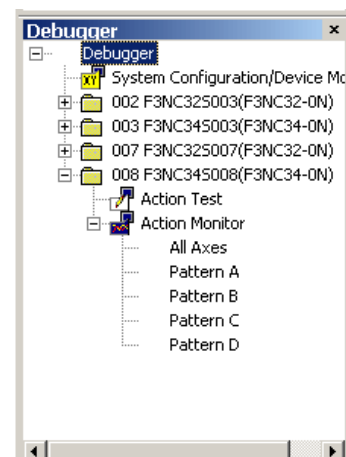
- **Project Window**

The project window displays the execution parameters of an open project or a list of advanced function module parameter files.



- **Debugger Window**

The debugger window displays debug/maintenance information for each registered parameter file.



- **Toolbar**

The toolbar shows the icons of frequently used commands for easier access. These commands can also be selected from the menu bar.



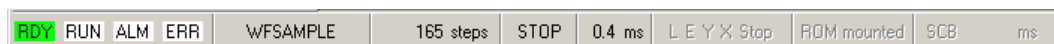
- **Window List Bar**

The Window List Bar displays a list of icons for windows that are displayed in ToolBox.



- **Action Status Bar**

The action status bar shows the operating status of the FA-M3 system (primarily the CPU module).



## CAUTION

The display of the action status bar is not updated when the monitor is suspended or when uploading is being performed using WideField3. To update the display of the action status bar, resume monitoring or wait for uploading to complete.

- **Status Bar**

The status bar indicates the status of ToolBox.



## SEE ALSO

For details on the information displayed in the menu bar, toolbar, action status bar, and status bar, see Section B1.1, "ToolBox Operation Screen," of the FA-M3 ToolBox Manual.

## B1.2 Configuring ToolBox

### B1.2.1 Setting Up User Environment

The section describes how to define the folder for storing project files, contents of the toolbar, display language, and so on, after installing ToolBox.

#### SEE ALSO

For details on user environment setup, see Section B1.4.2, “Environment Setup,” of the FA-M3 ToolBox Manual.

#### □ Specifying a Project Folder

1. Select [Tools]-[Environment Setup for ToolBox] from the menu bar.  
⇒ Screen (1) will be displayed.
2. Select the Folder Setup tab.
3. If required, specify a different folder for projects and click **OK**. Usually, no change is required.

#### TIP

Clicking **Default** reverts the screen to default values.

#### SEE ALSO

- To specify a different project folder, first create the folder using Explorer.
- For details on the default project folder, see Section B1.4.1, “Folder Configuration,” of the FA-M3 ToolBox Manual.



Screen (1)

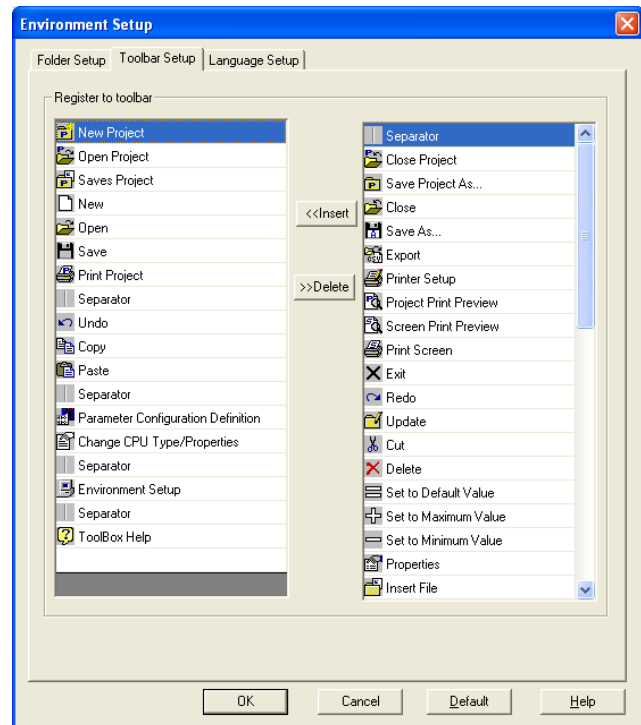
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## □ Customizing the Toolbar

1. Select the **Toolbar Setup** tab in the **ToolBox Environment Setup** window.  
⇒ Screen (2) will be displayed.
2. To include an item in the toolbar, highlight the item in the right window, and click **Insert**. To remove an item from the toolbar, highlight the item in the left window, and click **Delete**.
3. Click **OK** to confirm the setup.

### TIP

Clicking **Default** reverts to the default toolbar setup.

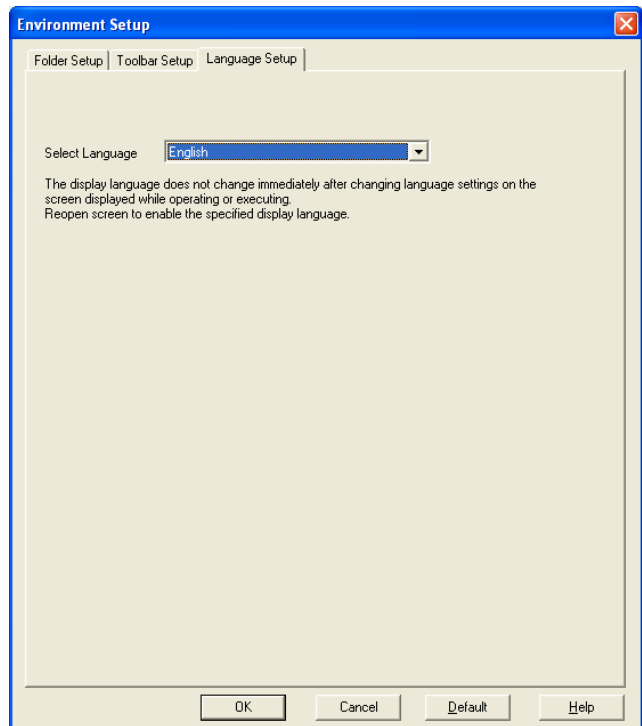


Screen (2)

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## □ Selecting the Display Language

1. Select the **Language Setup** tab in the **Environment Setup for ToolBox** window.  
⇒ Screen (3) is displayed.
2. Select a language from the **[Select Language]** list for the display language of ToolBox, and click **OK**.



Screen (3)

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## □ Detailed Setup

You can also specify other user environment conditions, such as whether to display confirmation messages at download or what registered parameters are to be displayed in simple setup windows.

1. Select [Tools]-[Environment Setup for Temperature Control and Monitoring Module] from the menu bar.

⇒ Screen (4) is displayed.

2. Click the Detailed Setup tab.

3. Select checkboxes for the desired EEPROM write confirmation options.

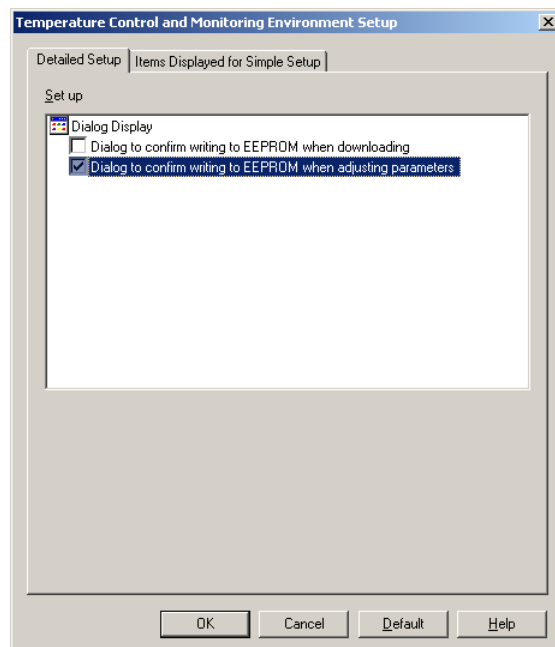
### **TIP**

By default, a dialog confirming whether to write to EEPROM is displayed when parameters are adjusted.

4. Click **OK** to confirm the selection. To customize the simple setup screens, follow the procedure below.

### **TIP**

Clicking **Default** reverts to default values.



Screen (4)

5. Select the Simple Setup tab.

⇒ Screen (5) will be displayed.

6. Select registered parameters to be displayed for editing in the Simple Setup screens.

**TIP**

If you check all registered parameters, the contents of the simple setup screens will be the same as those of detailed setup screens.

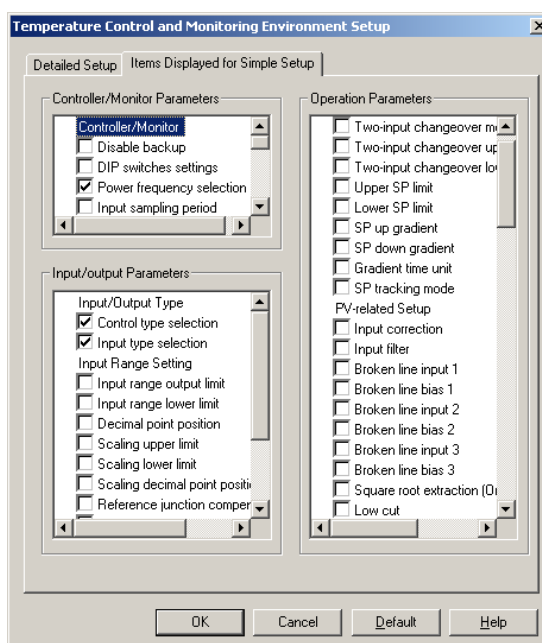
7. Click **OK** when you have finished setup.

**TIP**

Clicking **Default** reverts to default values.

**SEE ALSO**

For details on parameters to be displayed in the Simple Setup screens, see Section C1.1.1, "Tables of Registered Parameters."



Screen (5)





## B2 Editing a Project

This chapter describes how to edit a project.

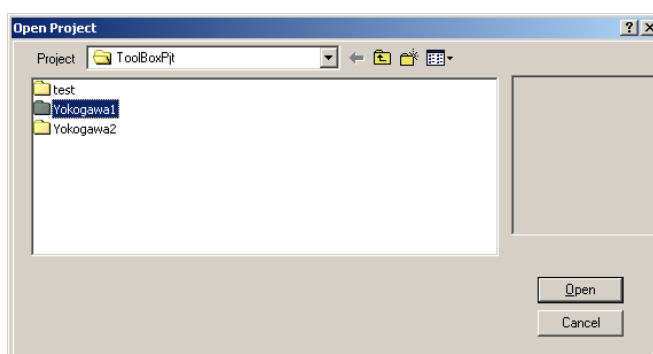
- Selecting a project → B2.1
- Creating and editing registered parameters → B2.2

### B2.1 Selecting a Project

This section describes how to select a project and how to open the registered parameter edit window.

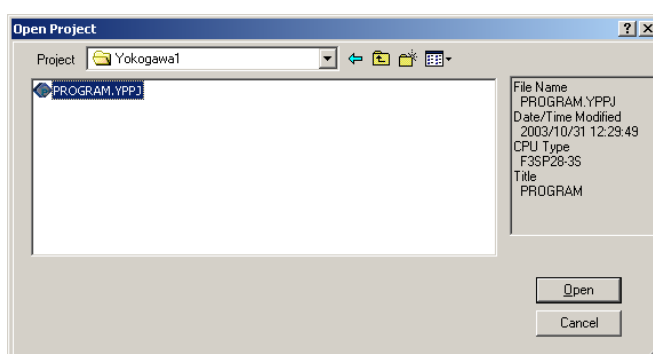
#### B2.1.1 Selecting a Project

1. Run ToolBox.
2. Select [File]-[Open Project] from the menu bar.  
⇒ Screen (1) will be displayed.
3. Select a project folder, and either double-click it or click **Open**.  
⇒ Screen (2) will be displayed.



Screen (1)

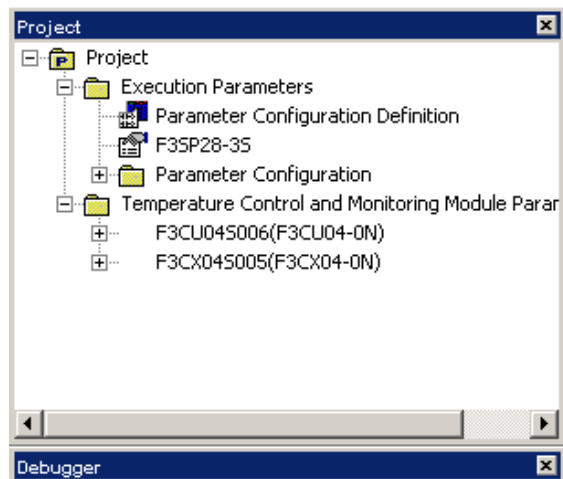
4. Select a project, and either double-click it or click **Open**.  
⇒ Screen (3) will be displayed.



Screen (2)

## B2-2

5. The structure of the project will be displayed in the project window.



Screen (3)

### B2.1.2 Opening the Registered Parameter Edit Window

1. Select [File]-[Open] from the menu bar.

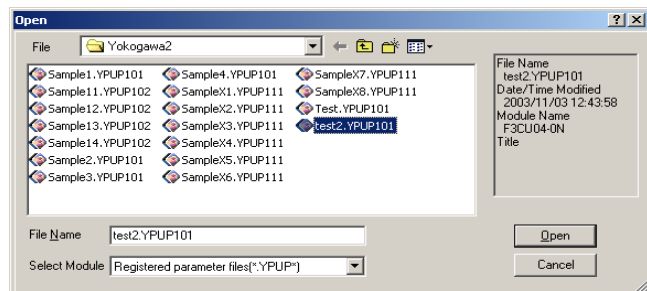
⇒ Screen (4) will be displayed.

2. Select a registered parameter file, and either double-click it or click **Open**.

⇒ Screen (4-1) will be displayed.

#### TIP

- Double-clicking the “Registered Parameters” icon under a registered parameter file in the project window in screen (3) also opens the file.
- The file name extension depends on the advanced function module type:
  - YPUP101 for F3CU04-0N
  - YPUP102 for F3CU04-1N
  - YPUP105 for F3CU04-0S
  - YPUP106 for F3CU04-1S
  - YPUP107 for F3CU04-0G
  - YPUP108 for F3CU04-1G
  - YPUP111 for F3CX04-0N
  - YPUP114 for F3CX04-0G



Screen (4)

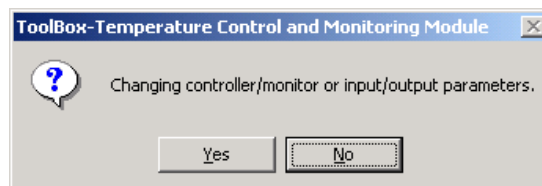
3. Click **Yes** or **No** to specify the first registered parameter screen to be displayed in the registered parameter edit window.

⇒ The following registered parameter screen is displayed:

**Yes**: Controller Parameter Setup screen  
**No**: Operation Parameter Setup screen

#### TIP

If you click **No**, the system presents the Operation Parameter Setup screen for editing, skipping the Controller Parameter Setup screen and Input/Output Parameter Setup screen.



Screen (4-1)

## B2.1.3 Registered Parameter Setup Screens

The following three registered parameter setup screens are displayed in the registered parameter edit window. Clicking **Next** causes the next screen to appear. This section describes how to set up registered parameters, using as an example simple setup on the controller parameter setup screen.

- ① Controller parameter setup (or monitor parameter setup)
- ② I/O parameter setup
- ③ Operation parameter setup

Highlighting a cell (in dark blue) displays a list box or other input helper screen. A cell is in different colors to indicate different statuses as follows:

- White: Default value
- Yellow: Modified and confirmed value
- Pink: Modified but unconfirmed value
- Red: Invalid value
- Gray: Read-only value

Clicking the cell of a parameter displays its description.

Displayed from left to right are:

File name  
Title name  
Module type

Register	Symbol	Name	Setup
81	FREQ	Power frequency selection	0
83	MD12	Controller mode for loops 1 and 2	0
84	MD34	Controller mode for loops 3 and 4	0

Specify the items to be displayed in Simple Setup.

Cancels all unconfirmed changes. If there are modified but unconfirmed parameters, a confirmation screen is displayed.

Shows the next screen (I/O Parameter Setup screen). All modified but unconfirmed parameters, if any, are validated.

Confirms all changes. All valid parameters have their cell colors changed from pink to yellow. If an invalid value is found, a range error message is displayed. If there are modified but unconfirmed controller or I/O parameters, a dialog box is displayed to confirm initialization. This button is enabled only when there is one or more modified but unconfirmed parameters.

Clicking this button displays a Detailed Setup screen showing all parameters for the current setup screen. The button name changes to **Simple Setup**. Clicking the button toggles between "Simple Setup" and "Detailed Setup".

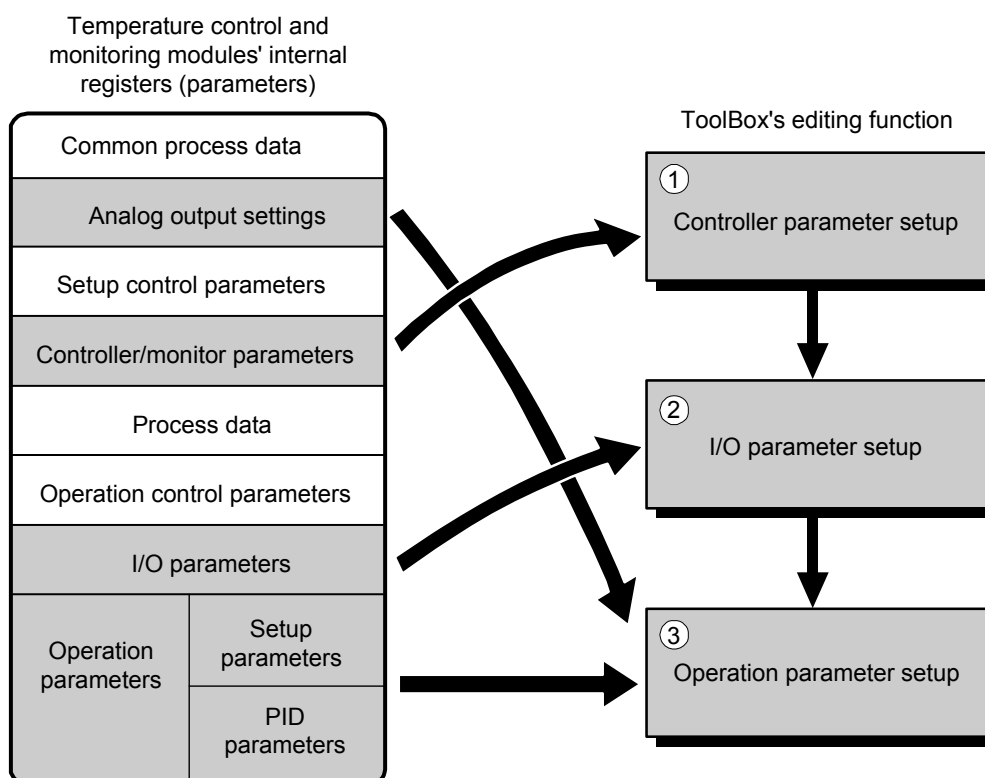
Allows you to enter or edit a title name and loop names.

Cancels editing. If there are any modified but unconfirmed parameters, a dialog box will appear to confirm whether to save or initialize the parameters.

## B2.2 Creating and Editing Registered Parameters

The internal registers (parameters) of temperature control and monitoring modules are grouped and shown in three parameter setup screens in ToolBox. Parameter groups (1), (2) and (3) should be created or edited in that order as shown below.

Each parameter setup screen is either a Detailed or a Simple Setup screen. While a Detailed Setup screen shows all parameters, a Simple Setup screen shows only frequently used ones.



### SEE ALSO

- For details on the registers of temperature control and monitoring modules, see the user's manual for the temperature control and PID module or the temperature monitoring module.
- For details on parameters that can be edited on the registered parameter setup screens, such as the type, valid data range and default value, see Section C1.1.1, "Tables of Registered Parameters."

## B2.2.1 Editing Registered Parameters (controller parameter setup)

1. Select the cell for a parameter you want to edit in screen (5) (controller parameter setup).

⇒ The list box button will appear.

### TIP

For the temperature monitoring module, the name of the screen will be "Monitor Parameter Setup" instead.

2. Click the button to open a list box, and select a desired value from the list.

### SEE ALSO

You may also directly key in a value in a cell. For information on how to use a list box, see Section B2.2.4, "About Parameter Input Helper Screens."

3. To edit a parameter that is not shown in the Simple Setup screen, click **Detailed Setup** to show the Detailed Setup screen. Otherwise, skip to Step 5.

### SEE ALSO

You can define in the Environment Setup window which parameters to show in the Simple Setup screen. For the procedure, see Section B1.2, "Configuring ToolBox."

4. Select a cell, click the button to open a list box, and select a desired value from the list or specify a desired range.

5. Click **Next**.

⇒ Screen (6) will be displayed.

### TIP

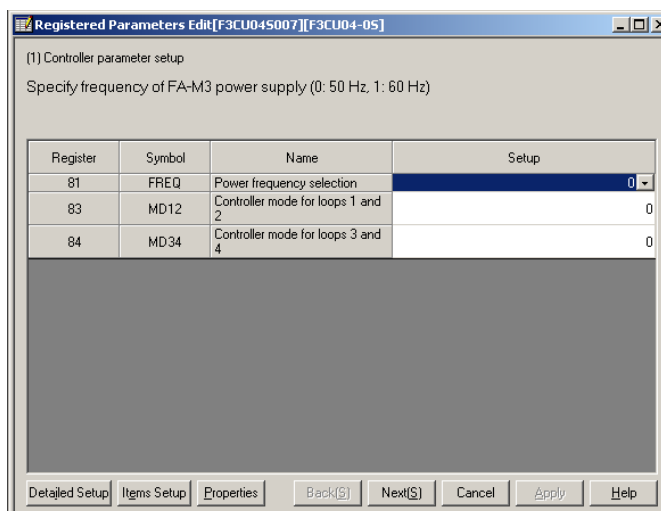
This screen is not displayed if no parameter has been modified.

6. Click **Initialize** or **Don't Initialize** to initialize or to not initialize the parameters on subsequent setup screens.

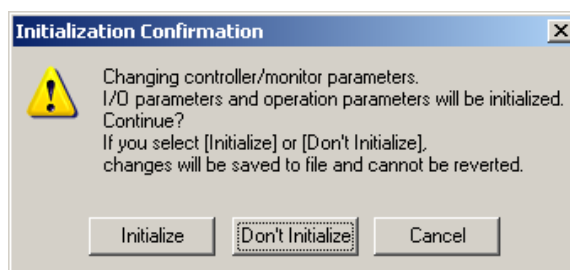
⇒ The I/O Parameter Setup screen (screen (7)) will be displayed.

### TIP

The registered parameter file is updated.



Screen (5)



Screen (6)

## B2.2.2 Editing Registered Parameters (I/O parameter setup)

1. Select the cell for a parameter you want to edit in screen (7) (I/O parameter setup).

⇒ The list box button will appear.

2. Click the button to open a list box, and select a desired value from the list.

### SEE ALSO

For information on how to use a list box, see Section B2.2.4, "About Parameter Input Helper Screens."

3. To edit a parameter that is not shown in the Simple Setup screen, click **Detailed Setup** to show the Detailed Setup screen. Otherwise, skip to Step 5.

4. Select a cell, click the button to open a list box, and select a desired value from the list or specify a desired range.

### TIP

For some parameters, you may have to click **OK** after editing.

5. Click **Next**.

⇒ Screen (8) will be displayed.

### TIP

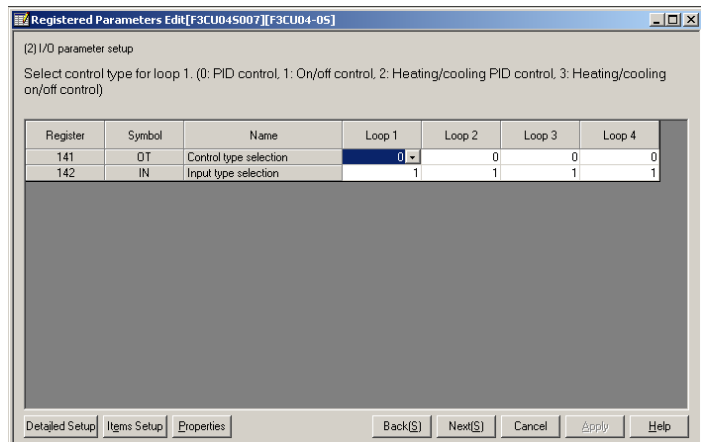
This screen is not displayed if no parameter has been modified.

6. Click **Initialize** or **Don't Initialize** to initialize or to not initialize the parameters on the next setup screen.

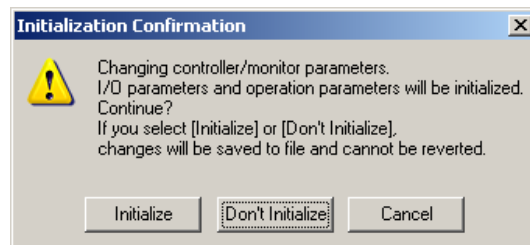
⇒ The operation Parameter Setup screen (screen (9)) will be displayed.

### TIP

The registered parameter file is updated.



Screen (7)



Screen (8)

## B2.2.3 Editing Registered Parameters (operation parameter setup)

1. Select the cell for a parameter you want to edit in screen (9) (operation parameter setup).

⇒ The button to open a list box or input helper screen will appear.

### TIP


For a temperature monitoring module, the PID Parameters tab is replaced by the SP parameters tab.

2. Click the button, and select a desired value from the list or specify a desired range.

### SEE ALSO

For information on how to use a list box, see Section B2.2.4, "About Parameter Input Helper Screens."

### TIP

For some parameters, you may have to click .

3. To edit a parameter that is not shown in the Simple Setup screen, click **Detailed Setup** to show the Detailed Setup screen. Otherwise, skip to Step 5.

4. Select a cell, click the button to open a list box and select a desired value from the list, or specify a desired range.

5. Click **Finish**.

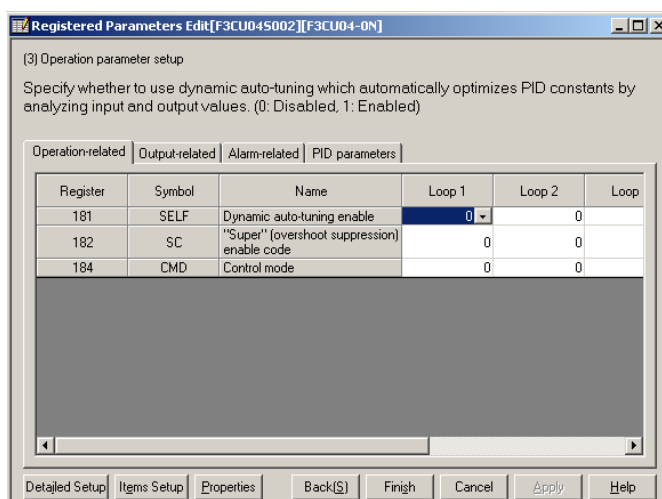
⇒ Screen (10) will be displayed.

### TIP

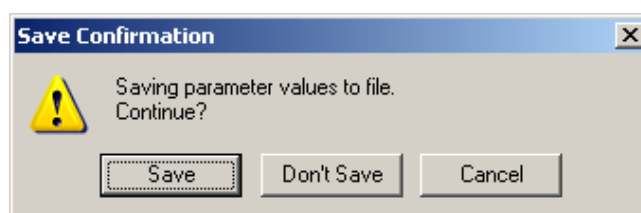
This screen is not displayed if no parameter has been modified.

6. Click **Save**.

⇒ The parameter file is updated.



Screen (9)



Screen (10)

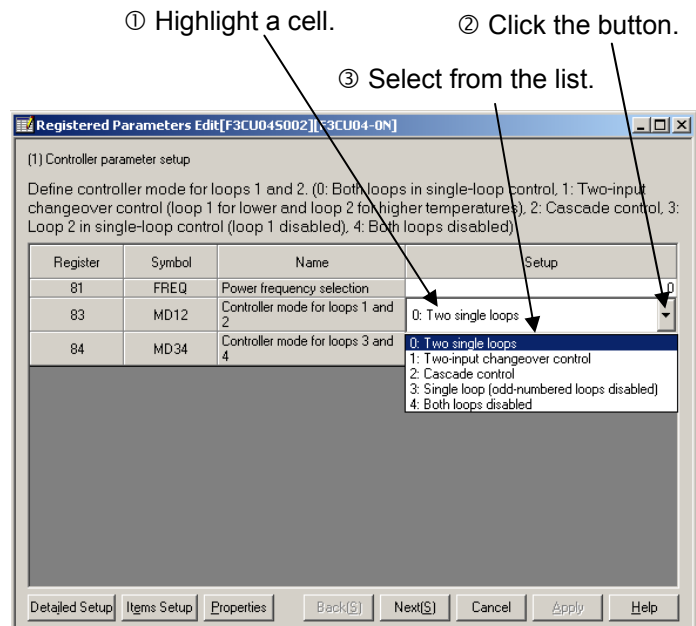
## B2.2.4 About Parameter Input Helper Screens

Highlighting a parameter setup cell shows a button for opening a list box or an input helper screen. This section describes how to use the list box and the parameter input helper screen.

You can also use the [Edit] menu on the menu bar to set a highlighted cell to the default, maximum or minimum value; or hide or show a highlighted column of cells.

### □ Using the List Box

1. In a parameter setup screen, ① highlight a cell to be edited.
2. ② Click the button to open a list box, and ③ select from the list.

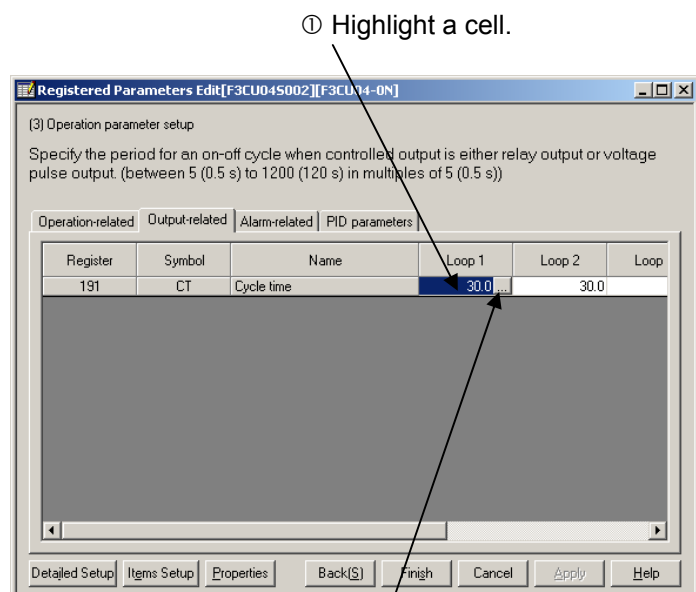


Screen (11)

### □ Using the Parameter Input Helper Screen

In the parameter input helper screen, you may directly key in a number, or select a value using the mouse or keyboard. The look of the parameter input helper screen depends on the selected parameter. The following description explains how to select an input value, using different parameter input helper screens as examples.

1. In a parameter setup screen, ① highlight a cell to be edited.
  2. ② Click the button displayed.
- ⇒ A parameter input helper screen will be displayed. The actual screen displayed will depend on the selected parameter.



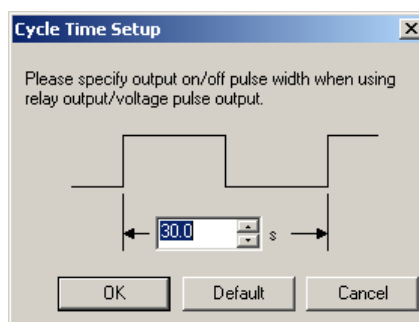
Screen (12)

② Click the button.



### ● Example 1

- Using the mouse:  
Modify the setting by clicking the spin button control, and click **OK**.
- Using the keyboard:  
Modify the setting by pressing the **↓** and **↑** keys, select **OK** by pressing the **Tab** key, and finally press the **Enter** key.

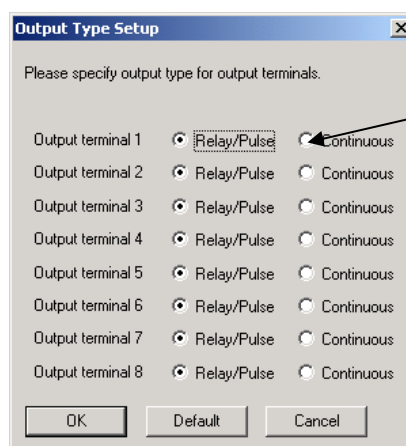


Click the spin button control.

Screen (13)

### ● Example 2

- Using the mouse:  
Click desired radio buttons, and click **OK**.
- Using the keyboard:  
Select a loop or other item to be modified by pressing the **Tab** key, and modify the setting by pressing the **→** and **←** keys for each item. After setting all items, select **OK** by pressing the **Tab** key, and finally press the **Enter** key.

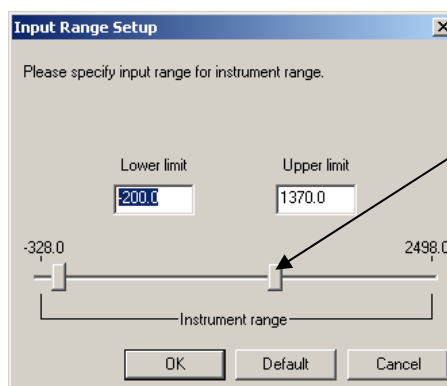


Click a radio button.

Screen (14)

### ● Example 3

- Using the mouse:  
Drag each slider to a desired position, and click **OK**.
- Using the keyboard:  
Select each slider by pressing the **Tab** key, modify the setting by pressing the arrow keys, select **OK** by pressing the **Tab** key, and finally press the **Enter** key. To modify the lower limit, use **→** and **←**. To modify the upper limit, use **Shift** + **→** and **Shift** + **←**.

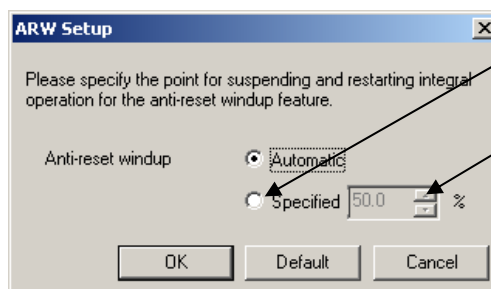


Drag the slider.

Screen (15)

### ● Example 4

- Using the mouse:  
Click a desired radio button, and click **OK**. If a spin button is available, modify the setting by clicking the spin button control.



Click a radio button.

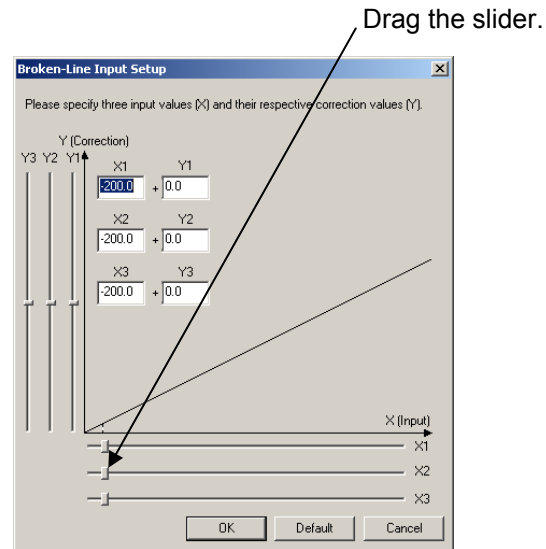
Click the spin button control.

Screen (16)

- Using the keyboard:  
Select a desired radio button by pressing the  $\downarrow$  and  $\uparrow$  keys. If a spin button is available, select it by pressing the  $\rightarrow$  key, and adjust the setting by pressing the  $\downarrow$  and  $\uparrow$  keys. Select **OK** by pressing the **Tab** key, and finally press the **Enter** key.

### ● Example 5

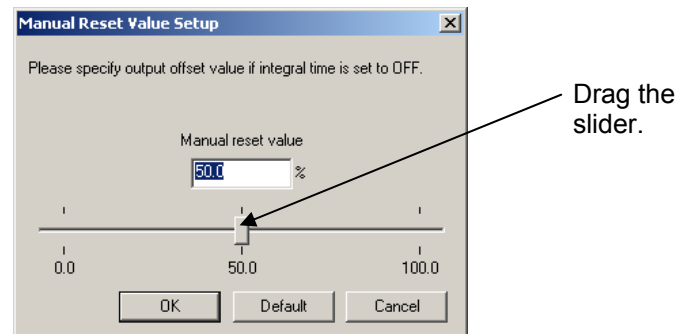
- Using the mouse:  
Drag each slider to a desired position, and click **OK**.
- Using the keyboard:  
Select each slider by pressing the **Tab** key, and modify the setting by pressing the  $\rightarrow$  and  $\leftarrow$  keys. Select **OK** by pressing the **Tab** key, and finally press the **Enter** key.



Screen (17)

### ● Example 6

- Using the mouse:  
Drag the slider to a desired position, and click **OK**.
- Using the keyboard:  
Select the slider by pressing the **Tab** key, and modify the setting by pressing the  $\rightarrow$  and  $\leftarrow$  keys. Select **OK** by pressing the **Tab** key, and finally press the **Enter** key.



Screen (18)

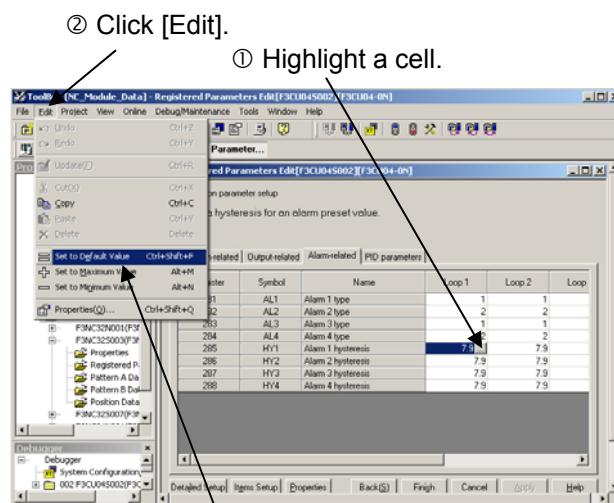
## □ Advanced Editing Functions

### ● Modifying the value of a cell

1. In a parameter setup screen, ① highlight a cell.
2. ② Select [Edit] from the menu bar, and ③ select one of the following commands:  
**[Set to Default Value]:** Changes the setting to the default value.  
**[Set to Maximum Value]:** Changes the setting to the maximum value.  
**[Set to Minimum Value]:** Changes the setting to the minimum value.

#### TIP

Right-clicking in a parameter setup screen also lists these commands.



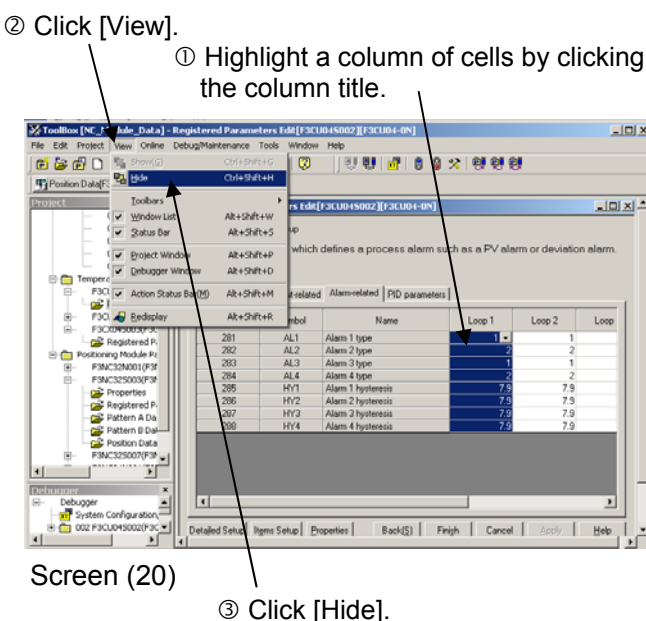
Screen (19)

### ● Hiding/showing a column of cells

1. In a parameter setup screen, ① highlight a column of cells that you want to hide by clicking the column title.
2. ② Select [Edit] from the menu bar, and ③ select the [Hide] command. In this example, the loop 2 column will be hidden.

#### TIP

- A hidden column on the Controller/Monitor Parameter Setup screen will no longer be hidden once another parameter setup screen is displayed.
- A hidden column on the I/O or Operation Parameter Setup Screen remains hidden until you issue the [Show] command for that column. To issue the [Show] command, select [Edit]-[Show] from the menu bar.
- Right-clicking on a parameter setup screen also lists these commands.
- The [Show] command is available only when one or more columns are hidden.



Screen (20)

## B2.2.5 Changing Module Type of a Parameter File

You can change the module type of an existing registered parameter file created previously for use with another temperature control and PID module or temperature monitoring module.

1. Select [Project]-[Change Module Type] from the menu bar.

⇒ The Select File dialog box is displayed.

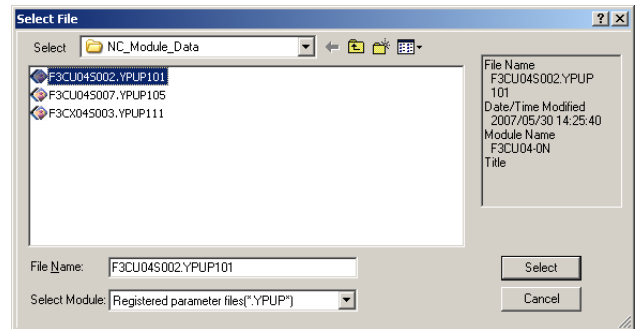
### TIP

You can also select a registered parameter file whose module type is to be modified from the Project window, and then select [Change Module Type] from its right-click pop-up menu.

2. Select a registered parameter file whose module type is to be changed, and click **Select**.

⇒ The Change Module Type dialog box is displayed.

3. Select a module type to be changed, and click **Select**.



Screen (21)

### TIP

- Any parameter that is present in the old module type but not present in the new module type will have its parameter value, if any, deleted. Any parameter that is not present in the old module type but present in the new module type will be stored with a default value.
- If you directly modify a parameter file created using a different version of ToolBox, some parameters may not be correctly modified.
- Processing of a module type change may take a while due to the time required for parameter matching.

## B3 Downloading Registered Parameters

This chapter describes how to download registered parameters from a PC to FA-M3.

- Connecting to FA-M3 → B3.1
- Downloading → B3.2
- Downloading to CPU module → B3.3
- Downloading restrictions → B3.4

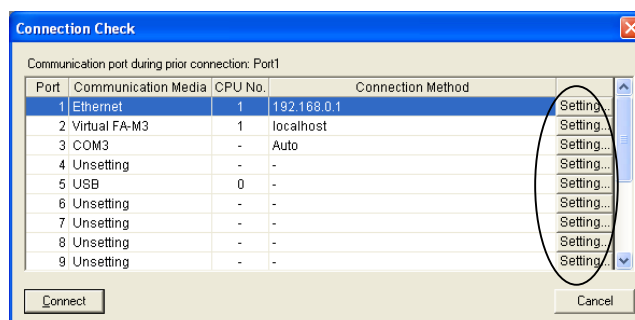
### B3.1 Connecting to FA-M3

Before you start connecting online to FA-M3, you must first connect your PC to the CPU module with a cable and set up communication settings according to the mode of connection.

#### B3.1.1 Checking Communications Setup and Connecting Online

1. Run ToolBox.
2. Select [Online]-[Connect] from the menu bar.

⇒ The Connection Check dialog box will be displayed.



Screen (1)

B030101\_01.VSD

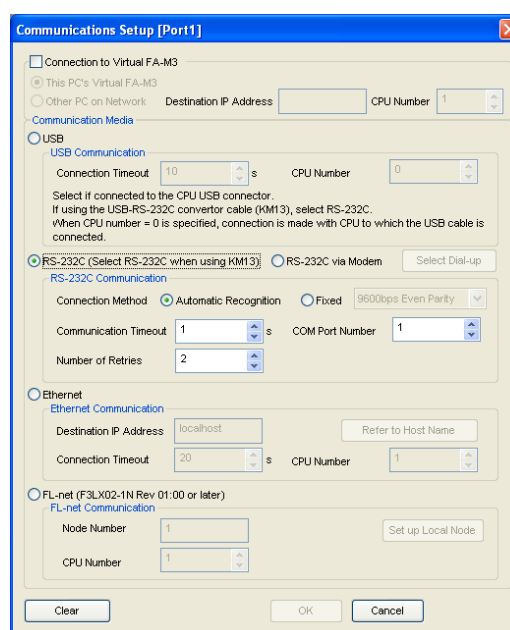
3. Click the [Setting...] button of the communication port to be used for the connection.

⇒ Screen (2) will be displayed.

4. Ensure that settings are correct, and click **OK**.

#### SEE ALSO

For details on communications setup, see Section B3.1, "Communications Setup," of the FA-M3 ToolBox Manual.

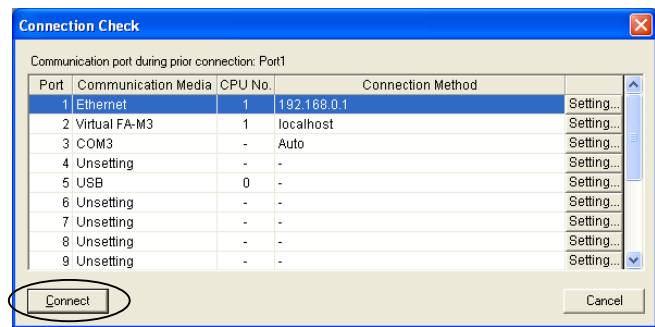


Screen (2)

B030101\_02.VSD

5. Click [Connect] on the **Connection Check** dialog box.

⇒ Communication is established between the FA-M3 system and the PC. The communication status is displayed on the action status bar and the status bar at the bottom of the operation screen.



Screen (3)

B030101\_03.VSD

## B3.2 Downloading

### B3.2.1 Downloading to Individual Modules

#### □ Downloading to Individual Modules

1. Select [Online]-[Download]-[Module...] from the menu bar.  
⇒ Screen (3) will be displayed.
2. Select modules to which you want to download data by clicking in the Select column.

#### ● Color Codes for Availability for Downloading

Modules are color-coded to indicate their availability for downloading as follows:

- White:  
Downloading to the module is allowed.
- Red:  
Downloading is not allowed because of a mismatch between the I/O configuration of the module. Verify the configuration of the file or the connected FA-M3 system.
- Yellow:  
Downloading to the CPU module is not allowed because the address setup for the CPU module is invalid or not done.
- Gray:  
Not accessible.

3. Click **Module**.

⇒ Screen (4) will be displayed.

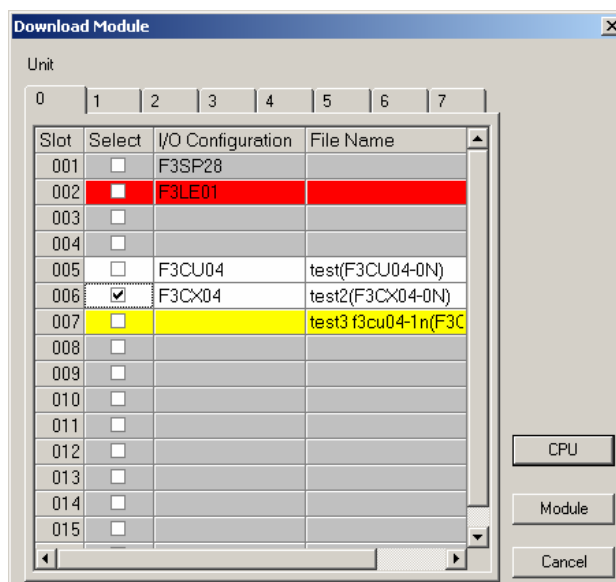
4. Select the loops for which parameters are to be downloaded.

5. Click **Download**.

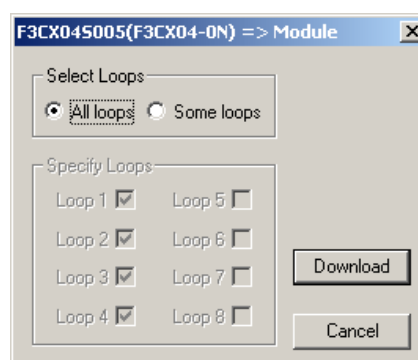
⇒ The Download dialog box is displayed during downloading. When the download is completed, it is replaced by screen (5).

#### TIP

Clicking **Stop** during downloading aborts the download process.



Screen (3)



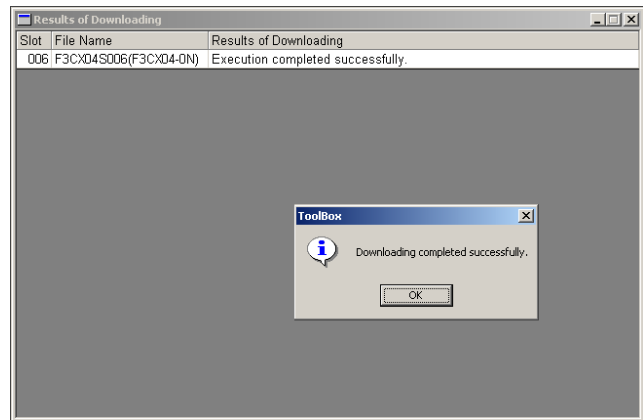
Screen (4)

6. Click **OK**.

7. The Results of Downloading window is displayed for you to verify the results of downloading.

## SEE ALSO

- For information on the messages on the result of downloading, see:  
Section B3.2.4, "Messages on the Result of Downloading."
- For information on how to verify downloaded parameters, see:  
Section B4.2, "Verifying Downloaded Registered Parameters," of the FA-M3 ToolBox Manual, and  
Section B3.2.5, "Messages on the Result of Comparison," of this manual.
- The CPU module must be in Stop mode before downloading can be performed.
- When registered parameters are downloaded to an advanced function module, the module is first put into Stop mode. After downloading, you can run the module again from the tuning window.



Screen (5)

## □ Downloading to the CPU Module

1. Select **[Online]-[Download]-[Module...]** from the menu bar.

⇒ Screen (6) will be displayed.

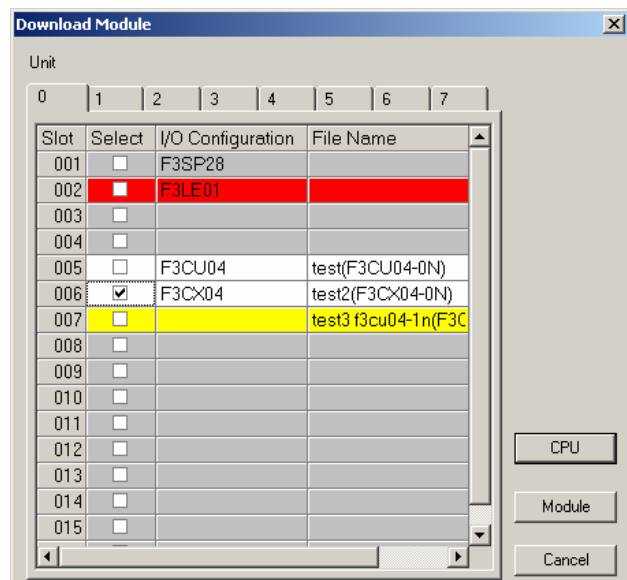
2. Select modules to which you want to download data by clicking in the **Select** column.

## SEE ALSO

For information on the color codes of modules indicating their availability for downloading, see the description entitled "Color Codes for Availability for Downloading" in Section B3.2.1.

3. Click **CPU**.

⇒ Screen (7) will be displayed.



Screen (6)



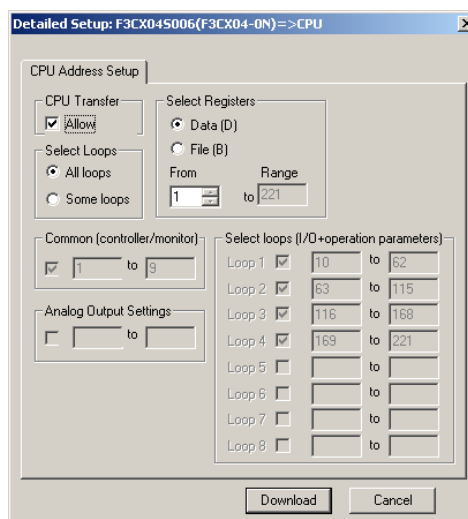
4. Set up the CPU address from which downloading is to begin.

5. Click **Download**.

⇒ The Download dialog box is displayed during downloading. When the download is completed, it is replaced by screen (8).

#### TIP

Clicking **Stop** during downloading aborts the download process.



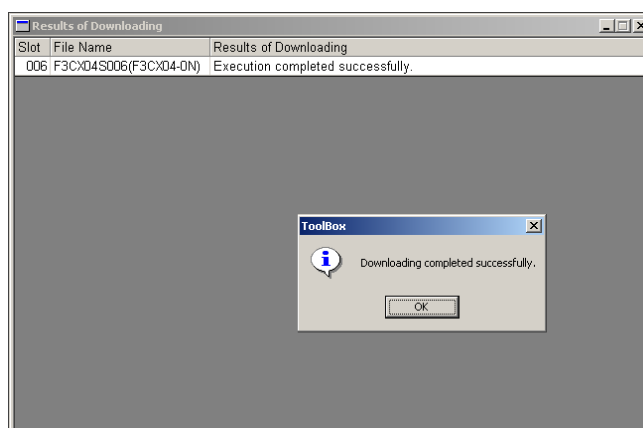
Screen (7)

6. Click **OK**.

7. The Results of Downloading window is displayed for you to verify the results of downloading.

#### SEE ALSO

- For information on the messages on the result of downloading, see:  
Section B3.2.4, "Messages on the Result of Downloading."
- For information on how to verify downloaded parameters, see:  
Section B4.2, "Verifying Downloaded Registered Parameters," of the FA-M3 ToolBox Manual, and  
Section B3.2.5, "Messages on the Result of Comparison," of this manual.



Screen (8)

## B3.2.2 Downloading to All Modules of a Project

1. Select **[Online]-[Download]-[Project...]** from the menu bar.

⇒ Screen (9) will be displayed.

2. Click **CPU** or **Module** to specify the download destination.

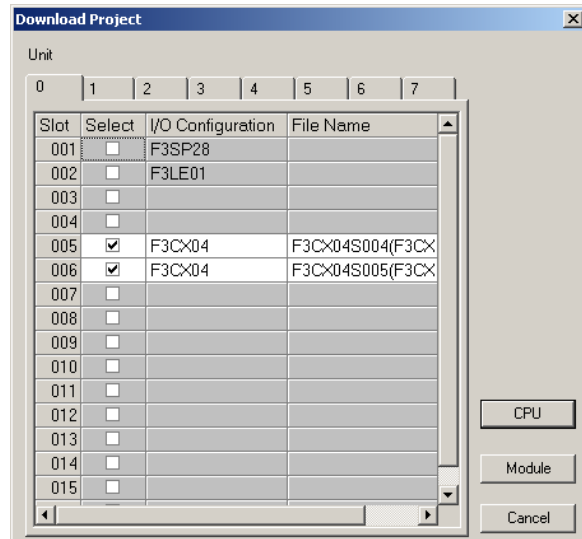
⇒ The Download dialog box is displayed during downloading. When the download is completed, it is replaced by screen (10).

### SEE ALSO

For information on the color codes of modules indicating their availability for downloading, see the description entitled “Color Codes for Availability for Downloading” in Section B3.2.1.

### TIP

Clicking **Stop** during downloading aborts the download process.



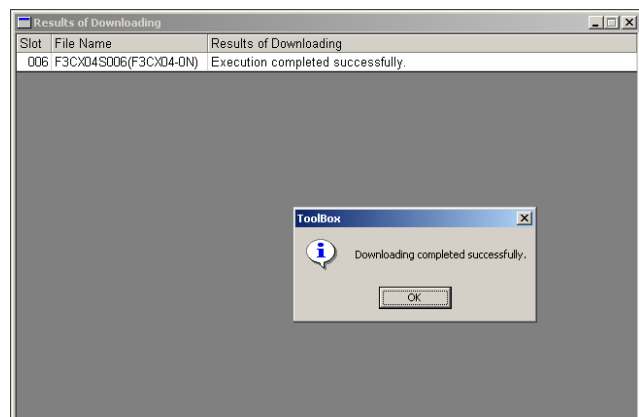
Screen (9)

3. Click **OK**.

4. The **Results of Downloading** window is displayed for you to verify the results of downloading.

### SEE ALSO

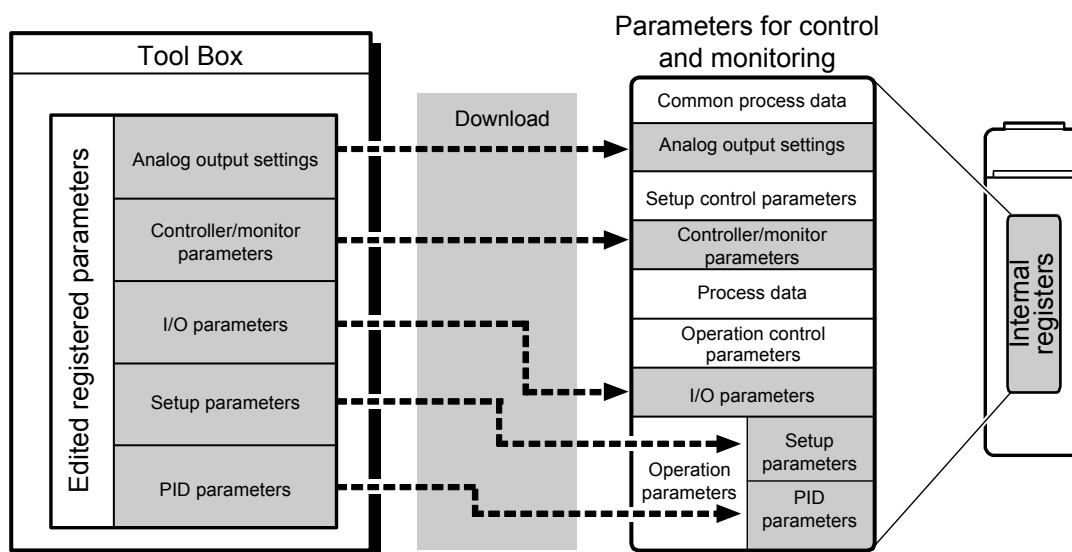
- For information on the messages on the result of downloading, see:  
Section B3.2.4, “Messages on the Result of Downloading.”
- For information on how to verify downloaded parameters, see:  
Section B4.2, “Verifying Downloaded Registered Parameters,” of the FA-M3 ToolBox Manual, and  
Section B3.2.5, “Messages on the Result of Comparison,” of this manual.
- The CPU module must be in Stop mode before downloading can be performed.
- When registered parameters are downloaded to an advanced function module, the module is first put into Stop mode. After downloading, you can run the module again from the tuning window.



Screen (10)

### B3.2.3 Downloaded Registered Parameters

Created registered parameters are downloaded to the registers of the temperature control and monitoring modules as follows:



### B3.2.4 Messages on the Result of Downloading

The Results of Downloading window may display one or more of the following messages. Read the messages and take necessary actions, if any.

**Table B3.1 List of Messages on the Result of Downloading**

No.	Message	Description	Remarks
1	Execution completed successfully.	Downloading is successfully completed.	
2	Aborted.	The [Stop] button was pressed during downloading, and downloading was aborted.	
3	NNN parameter (9999) is invalid.	The NNN parameter value is beyond the upper or lower limit.	*1
4	Failed to write "NNN" parameter (9999).	An error has occurred when the NNN parameter is being written.	*1
5	Invalid module type	There is a mismatch in the temperature control and monitoring module type between ToolBox and FA-M3. The last 2 digits of the type may be different, for example, "F3CU04-0N" for ToolBox but "F3CU04-1N" for FA-M3.	
6	Communication server is busy.	The communication server is busy. WideField3 may be communicating with FA-M3.	
7	Invalid dialog information file	Dialog information file was found to be damaged during online processing. The ToolBox environment file may have been changed by a user.	
8	Memory error	Available memory is insufficient.	

\*1 : "NNN" denotes either "Controller/Monitor," "Input/Output," or "Operation."  
 "9999" denotes the number of the register in error.  
 For details on register numbers, see Section C1.1.1, "Tables of Registered Parameters."  
 For example, the following error message may appear if downloading from ToolBox fails due to an error:  
 "Input/Output" parameter (147) is invalid.

## B3.2.5 Messages on the Result of Comparison

The Results of Comparison window shows one or more of the following messages. Confirm the displayed information and take action as necessary.

**Table B3.2 List of Messages on the Result of Comparison**

No.	Message	Description	Remarks
1	Execution completed successfully.	Comparison is successfully completed.	
2	Aborted.	The [Stop] button was pressed during downloading, and downloading was aborted.	
3	Failed to read "NNN" parameter (9999).	An error has occurred when (uploading) the NNN parameter is being read.	*1
4	Value mismatch for "NNN" parameter (9999).	There is a mismatch between the NNN parameter value in ToolBox and FA-M3 (module).	*1
5	Invalid module type	There is a mismatch in the temperature control and monitoring module type between ToolBox and FA-M3. The last 2 digits of the type may be different, for example, "F3CU04-0N" for ToolBox but "F3CU04-1N" for FA-M3.	
6	Communication server is busy.	The communication server is busy. WideField3 may be communicating with FA-M3.	
7	Invalid dialog information file	Dialog information is found to be damaged during online processing. The ToolBox environment file may have been changed by a user.	
8	Memory error	Available memory is insufficient.	

\*1 : "NNN" denotes either "Controller/Monitor," "Input/Output," or "Operation."  
 "9999" denotes the number of the register in error.  
 For details on register numbers, see Section C1.1.1, "Tables of Registered Parameters."  
 For example, the following error message may appear if downloading from ToolBox fails due to an error:  
 "Input/Output" parameter (147) is invalid.

### TIP

For details on how to perform comparison, see:  
 Section B4.2, "Verifying Downloaded Registered Parameters," of the FA-M3 ToolBox Manual.

## B3.3 Downloading to CPU Module

### ● Registered Parameters Downloaded to a CPU Module

Registered parameters (files) downloaded to the CPU module are stored in its data (file) registers as shown below.

**Table B3.3 Internal Data Registers of CPU Module Used**

	Parameters	Number of Data (File) Registers Used		
		F3CU04-0S F3CU04-0N F3CU04-0G	F3CU04-1S F3CU04-1N F3CU04-1G	F3CX04-0N F3CX04-0G
1	Controller/monitor parameters	13	18	9
2	Analog output settings	-	8	-
3	I/O and operation parameters (for loops 1, 2, ...)	128	128	53
	Total number of registers used	525	538	221

Controller/monitor parameters, analog output settings, I/O parameters, and operation parameters (for loops 1, 2, 3, ...) downloaded from ToolBox to the CPU module are stored in data registers of the CPU module in ascending order of the addresses. Although you can specify which parameters are to be downloaded, this will not affect the number of data registers used as registers for all parameters are reserved regardless of whether the parameters are actually downloaded.

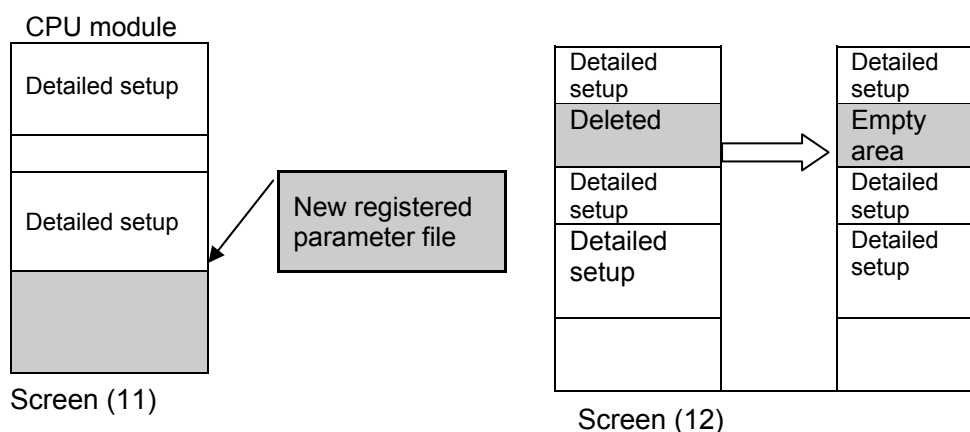
#### SEE ALSO

- You can manually change the start register address for storing each group of parameters. For details, see the description entitled "Downloading to the CPU Module" in Section B3.2.1.
- For details on the addresses (positions) of the data registers of the CPU module used, see Section C1.1.4, "CPU Parameter Positions."

### ● When Multiple CPU Module Areas are Specified in Configuration Definition

When an area is newly added in configuration definition (detailed setup), the addresses of the CPU module data (file) registers are automatically rearranged so that new addresses for the added area are appended to the existing addresses (see screen (11)).

All relevant data register addresses are reserved for their corresponding parameters at the time of configuration definition. This mapping between data registers and their addresses is not affected even if some detailed setup data is deleted in configuration definition. In this case, an empty area with no data still has its addresses reserved (see screen (12)).



## B3.4 Downloading Restrictions

- **Operation of the Temperature Control and Monitoring Modules**

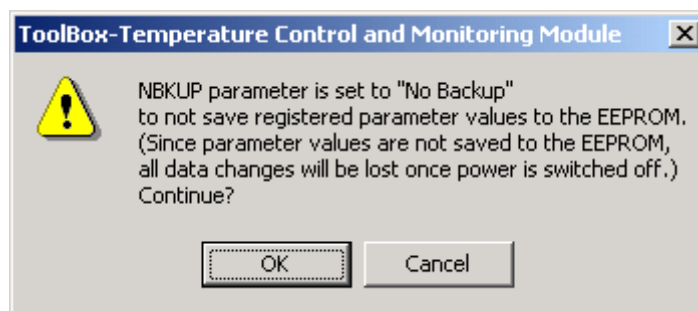
- When downloading begins, the modules enter Setup mode, and execution stops.

- **Operation of the CPU Module**

- The CPU module changes from Run to Stop mode. When downloading completes, you can run the CPU module as required.

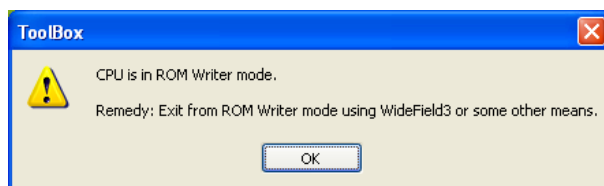
- **Debugging Function of ToolBox**

- If downloading is done when the action monitor, tuning, or parameter adjustment screen is displayed, the debugger function is suspended until downloading completes. When downloading completes, the debugger function automatically resumes provided the parameter scale or some other parameters are not changed. Otherwise, the debugger function remains suspended.
- If the registered parameter NBKUP is set to "1: No backup," the download function transfers the registered parameters to the registers but does not save them in the EEPROM in the module. In this case, the following dialog box will be displayed before download begins. You may change the NBKUP parameter as required.



- **If the CPU Operation Mode of the CPU Module is ROM Writer Mode**

- Downloading is not available if the CPU operation mode of the CPU module is set to ROM writer mode. In this case, the following dialog box will be displayed. Terminate ROM writer mode of the CPU module using WideField3 as required.



B0304\_02.VSD

- **If the Input Type Is Determined Using the Hardware Switches**
  - If the input type is determined using hardware switches, set the input type selection parameter to match the setting of the hardware switches before downloading.  
If the hardware switches of an advanced function module are not set to "0: Software setting," the setting of the input type selection parameter downloaded from ToolBox to the module will be ignored. However, if the input type determined by the hardware switches is not the same as the setting of the input type selection parameter as downloaded, a range error may occur during downloading depending on the range/scale setting.





## B4 Checking FA-M3 Operation Using Action Monitor

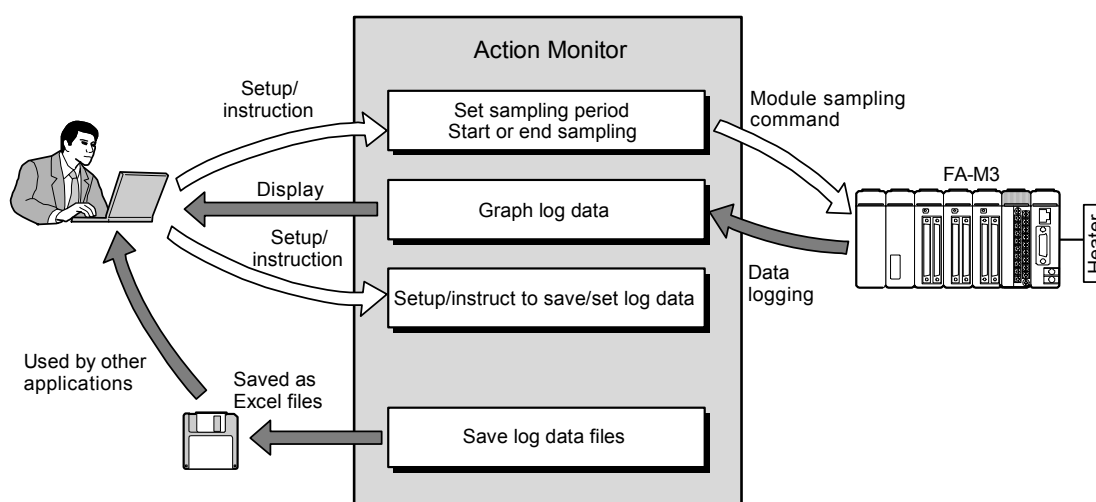
This chapter describes how to display Action Monitor screens and how to save displayed data.

- What is Action Monitor? → B4.1
- Using Action Monitor → B4.2

### B4.1 What is Action Monitor?

Using the Action Monitor function, you can read and display on a computer screen the contents of registers of temperature control and monitoring modules, as well as data of devices of CPU modules.

You can check registered parameters with the following dataflow.



#### CAUTION

- Do not change the system time setting of your computer when using the Action Monitor. The Action Monitor uses the system timer of your computer for its time management. If the system time setting of your computer is changed during action monitoring, the Action Monitor may not operate correctly.
- Although the Action Monitor can continuously sample data from a module, the data sampling function is really designed for temporary module adjustment, and thus is not guaranteed to function as a data recorder for continuous process operation.
- The Action Monitor samples data from a module through communication. If the communications channel suffers noise or other interference, incorrect graphs may be displayed.

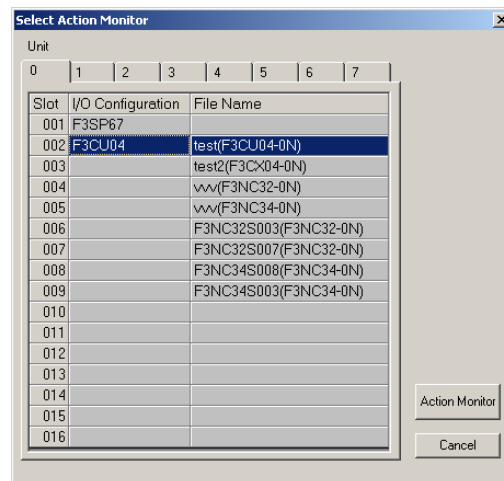
## B4.2 Using Action Monitor

### B4.2.1 Displaying Action Monitor Screens

1. Run ToolBox, open a project, and connect to FA-M3.
2. Select [Debug/Maintenance]-[Action Monitor...] from the menu bar.  
⇒ The Select Action Monitor screen will be displayed.
3. In the Select Action Monitor screen, highlight the module you want to monitor by clicking the corresponding cell.  
⇒ See screen (1).
4. Click **Action Monitor**.  
⇒ Action Monitor screen (2) will be displayed.

#### TIP

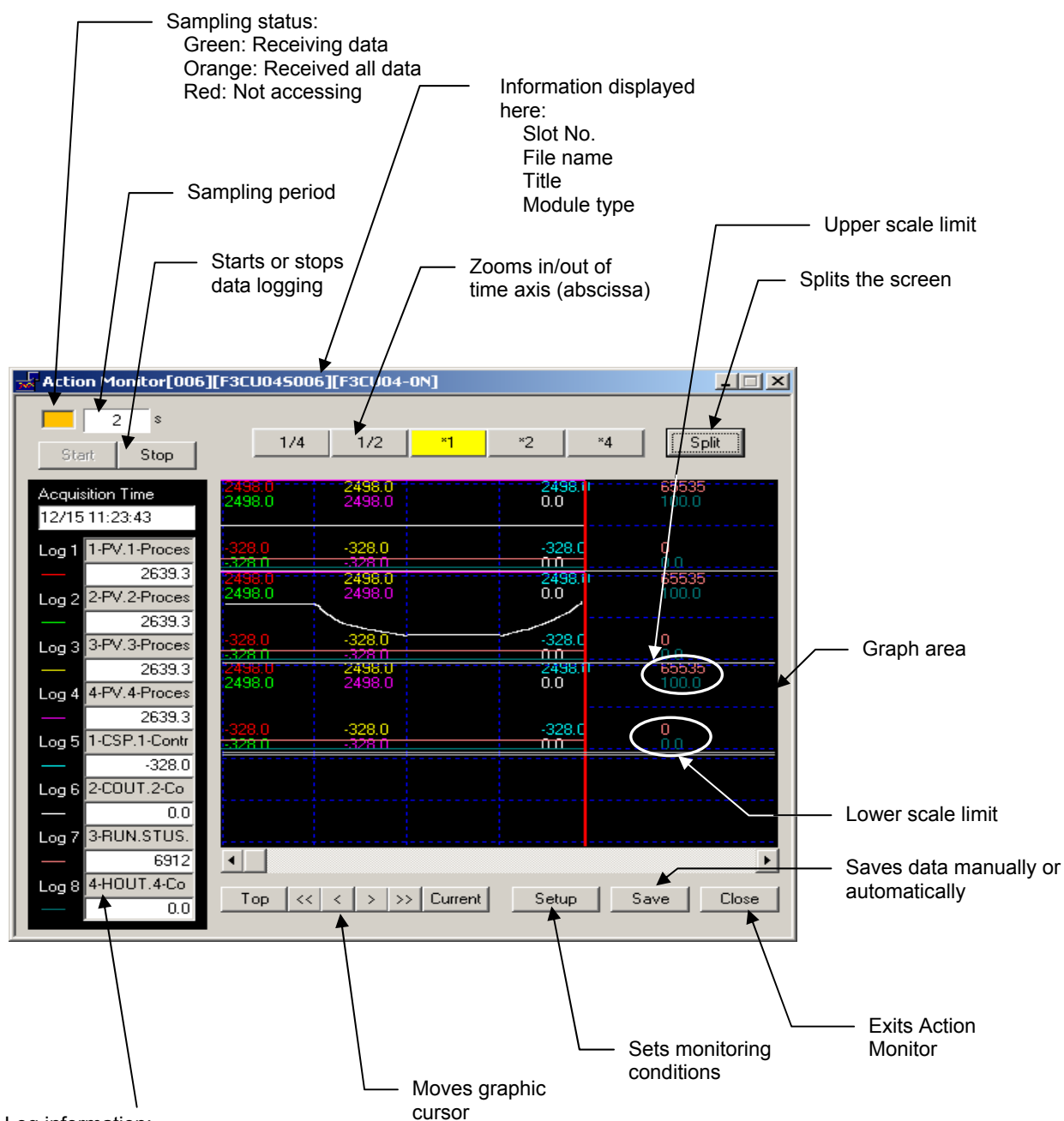
- As an alternative way to display the Action Monitor screen, you may also double click Action Monitor under the relevant module name in the Debugger Window.
- You may open up to four Action Monitor screens concurrently. The Action Monitor screen first opened for a particular slot is the main monitor, and any other Action Monitor screens opened concurrently for the same slot are auxiliary monitors. Auxiliary monitors allow monitoring only and data displayed in them cannot be saved.



Screen (1)

## ● Action Monitor Screen (2)

The screen layout of an Action Monitor screen is shown below.



Log information:

■ For a register of a module:

Loop No.-Symbol-Name

Meaning of the displayed loop No. :

- 0 denotes common parameters.
- 1-4 denotes loops 1-4 respectively.

■ For a device of a CPU module:

- CPU (Specified device No.)

Button	Keys	Description
	[←]	Shift left by 1 point.
	[→]	Shift right by 1 point.
	[Shift]+[←]	Shift left by 20 points.
	[Shift]+[→]	Shift right by 20 points.
	[Shift]+[↑]	Jump to the first point.
	[Shift]+[↓]	Jump to the last point.

## B4.2.2 Selecting Data to be Monitored

### □ Specifying Log Items

1. Click **Setup** on the Action Monitor screen (2).  
⇒ Screen (3) will be displayed.
  2. Specify the sampling period by clicking a radio button, and specify registers to be monitored by selecting from the loop and register list boxes.
- **Registers Listed in the Register List Box**
    - When loop number is set to 0:  
Registers for controller/monitor parameters as displayed in the Simple Setup screens for registered parameters are displayed in the list box.
    - When loop number is set to 1-4:  
The following registers are displayed in the list box in the given order:
      - ① Common process data registers
      - ② Registers as displayed in the Simple Setup screens for registered parameters
      - ③ Registers used for tuning

### SEE ALSO

For details on common process data registers, see Section C1.1.2, "Common Process Data."

For details on registered parameters, see Section C1.1.1, "Tables of Registered Parameters."

For details on registers used for tuning, see Section C1.1.3, "Registers Used for Tuning."

- When loop is set to [CPU]  
(for monitoring of a CPU device):  
Devices registered using **CPU Device Registration** are displayed in the list box.

### TIP

For details on how to register CPU devices, see:

- Monitoring CPU Devices.

Screen (3)

Table B4.1 Sampling Period and Logging Duration

Period	Duration	Total Number of Samples
1 s	24 min	Up to 1440 samples can be taken for each of 8 registers (Log 1 to Log 8). Old sample values are replaced by new sample values chronologically.
2 s	48 min	
5 s	2 hr	
10 s	4 hr	
1 min	24 hr	
10 min	240 hr	

3. Specify the scale range for a graph to be displayed on the monitor screen by entering appropriate values in the [Upper Limit] and [Lower Limit] columns.

**TIP**

When you select an item to be monitored, its predefined default upper and lower limit values are displayed.

4. Click **OK**.

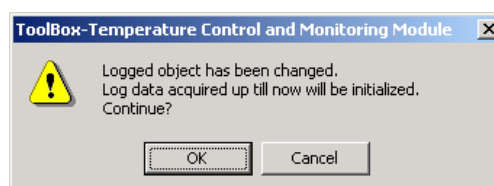
⇒ Screen (4) will be displayed.

5. Click **OK** to acknowledge the displayed information.

⇒ Edited changes are applied.

**TIP**

Accumulated log data is discarded when edited changes are applied so you should always save any required log data before applying edited changes.



Screen (4)

## □ Monitoring CPU Devices

1. Click **CPU Device Registration** on the **Monitor Setup** screen.

⇒ Screen (5) will be displayed.

2. Select either 'D' (data register) or 'B' (file register) for the device type to be registered, and enter a device number.

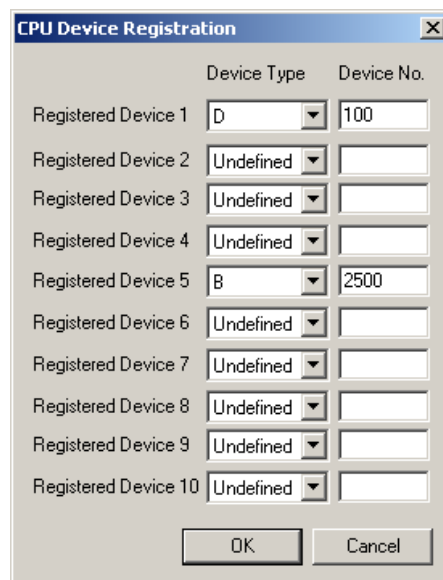
3. Click **OK**.

⇒ Control returns to the Monitor Setup screen.

4. Select "CPU" in the Loop column, and then select a register from the registered CPU devices displayed in the Register list box.

### TIP

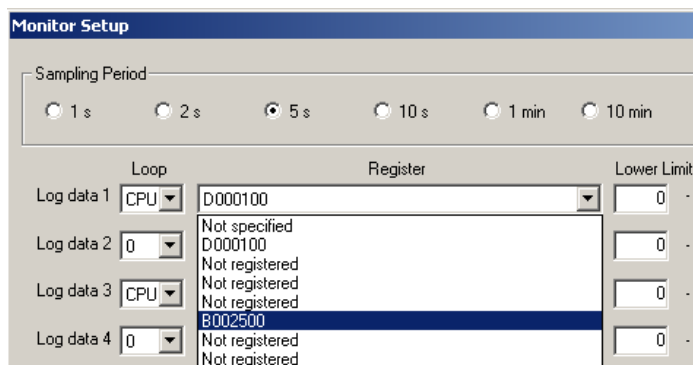
- Monitored data is sampled on word basis; monitoring of long word data is not allowed.
- You can specify any upper and lower limits between -32768 and 32767 for a CPU device.



The 'CPU Device Registration' dialog box contains a table with two columns: 'Device Type' and 'Device No.'. It lists 10 registered devices. Registered Device 1 has type 'D' and number '100'. Registered Device 5 has type 'B' and number '2500'. All other devices have type 'Undefined' and an empty number field. At the bottom are 'OK' and 'Cancel' buttons.

	Device Type	Device No.
Registered Device 1	D	100
Registered Device 2	Undefined	
Registered Device 3	Undefined	
Registered Device 4	Undefined	
Registered Device 5	B	2500
Registered Device 6	Undefined	
Registered Device 7	Undefined	
Registered Device 8	Undefined	
Registered Device 9	Undefined	
Registered Device 10	Undefined	

Screen (5)



The 'Monitor Setup' dialog box has a 'Sampling Period' section with radio buttons for 1 s, 2 s, 5 s (selected), 10 s, 1 min, and 10 min. Below is a table for logging data with columns for 'Log data', 'Loop', 'Register', and 'Lower Limit'. Log data 1 and 3 are set to 'CPU', while Log data 2 and 4 are set to '0'. The 'Register' column shows a list of available registers for each loop, with 'B002500' selected for Log data 3. All 'Lower Limit' fields are set to '0'.

Log data	Loop	Register	Lower Limit
Log data 1	CPU	D000100	0
Log data 2	0	Not specified D000100 Not registered	0
Log data 3	CPU	Not registered Not registered B002500	0
Log data 4	0	Not registered Not registered	0

Screen (6)

## □ Starting and Ending Logging

### ● Starting Logging

1. Specify registers to be logged, and click **Start** in the Action Monitor screen (2).

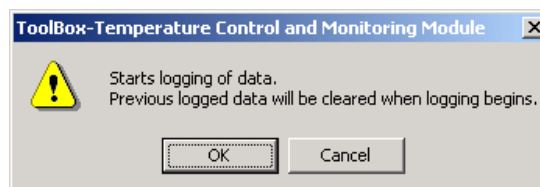
⇒ Screen (7) will be displayed.

2. Click **OK**.

⇒ The selected registers will be logged at the specified sampling period.

#### TIP

If you stop and then restart logging, sampling begins anew. All accumulated log data will be discarded so you should always save any required data before restarting data logging.



Screen (7)

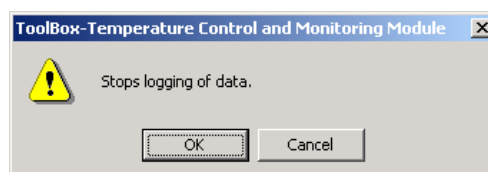
### ● Ending Logging

1. Click **Stop** in the Action Monitor screen (2).

⇒ Screen (8) will be displayed.

2. Click **OK**.

⇒ Logging will stop.



Screen (8)

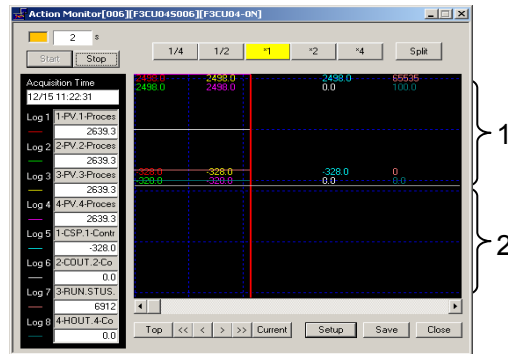
#### TIP

If you disconnect an online connection in ToolBox, logging is stopped automatically. All accumulated log data is retained as usual, the same as when logging is stopped manually.

## □ Splitting the Graph Area of the Action Monitor Screen

You can split the graph area of the Action Monitor screen as shown below.

Split into two sub-screens: 1 and 2



Screen (9)

Split into four sub-screens: 1, 2, 3 and 4



1. Click **Split** on the Action Monitor screen.

⇒ Screen (10) will be displayed.

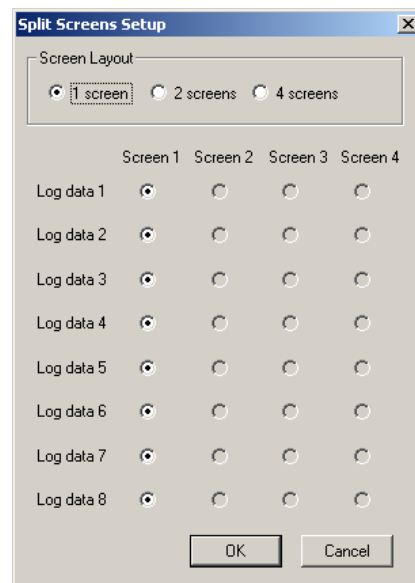
2. Specify how logged data is to be displayed in the sub screens.

### TIP

- If [1 screen] is selected, Screens 2 to 4 are not available.
- If [2 screens] is selected, Screens 3 and 4 are not available.

3. Click **OK**.

⇒ The graph area will be split into sub-screens and data is displayed accordingly, as shown in screen (9).



Screen (10)



## B4.2.3 Saving Monitored Data

The Action Monitor function tries to acquire samples from an advanced function module at a fixed sampling period. Depending on the communications conditions, however, samples may not be acquired exactly at the specified sampling period. To compensate for any deviation in sampling timing, the function may be set to correct sampled data with respect to correct sampling timing. The Action Monitor screen displays such corrected data.

You can either save raw or corrected data as log data. Other application programs may then be used to display the log data in graphs.

Log data may be saved in CSV format manually or automatically as follows:

- Manually: You can manually save a part of the log data by specifying a logging duration or a range of points.
- Automatically: You can set up the Action Monitor function to automatically save part of the log data, by specifying a time and duration.

### SEE ALSO

You may use Microsoft Excel or other application programs to display these saved log data as graphs. For details on the procedure, see Section B7.2, "Using Created Data."

#### □ Saving Manually

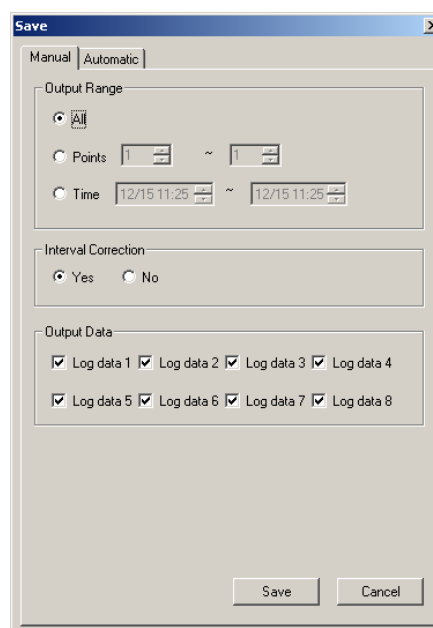
1. Click **Save** on the Action Monitor screen.

⇒ Screen (11) will be displayed.

2. Select the Manual tab.

3. Specify the output range by clicking a radio button in the output range area.

- All:  
All log data points are saved.
- Points:  
A specified range of log data points is saved.
- Time:  
Log data points falling within a specified duration are saved.



Screen (11)

4. **Specify whether to correct sampled data with respect to correct sampling timing (interval correction) by clicking a relevant radio button.**

- Yes:  
Sampled log data is corrected with respect to correct sampling timing before output for easier subsequent display in graphs.
- No:  
Sampled log data is saved without correction.

5. **Checkmark the data to be saved in the Output Data area.**

6. **Click Save.**

⇒ Screen (12) will be displayed.

7. **Enter a file name.**

### **TIP**

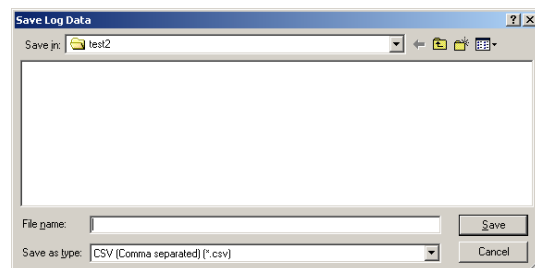
The full pathname (including folder name) of the CSV-formatted file to be exported must not be longer than 254 characters.

8. **Click Save.**

⇒ The log data will be saved in the specified file.

### **TIP**

The file is saved in the same folder containing the project that is currently open.



Screen (12)

## ☐ **Saving Automatically**

1. **Click Save on the Action Monitor screen (2).**

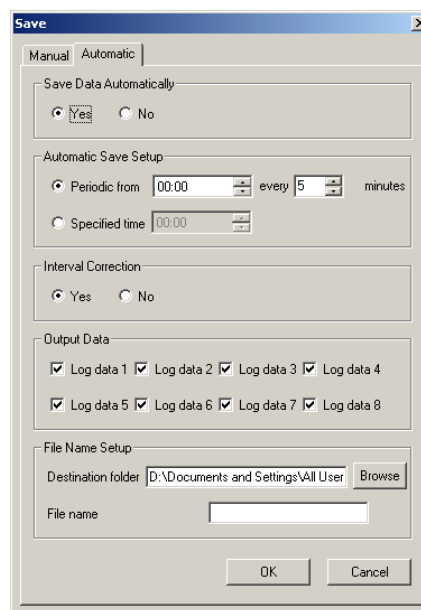
2. **Select the Automatic tab.**

⇒ Screen (13) will be displayed.

3. **Click [Yes] in the Save Data Automatically area.**
  - Yes:  
Log data is automatically saved.
  - No:  
Log data is not automatically saved.
4. **Specify whether to perform automatic saving periodically by clicking a radio button and specifying an interval and/or start time in the Automatic Save Setup area.**
  - Periodic:  
Automatic saving is performed periodically at the specified interval (selectable from 5 to 2880 minutes) starting at the specified time.
  - Specified time:  
Automatic saving starts at the specified time.
5. **Specify whether to correct sampled data with respect to correct sampling timing by clicking a radio button in the Interval Correction area.**
  - Yes:  
Sampled log data is corrected with respect to correct sampling timing before output for easier subsequent display in graphs.
  - No:  
Sampled log data is output without correction.
6. **Checkmark the data to be output in the Output Data area.**
7. **Specify the folder for saving log data files, and enter the common file name prefix for log data files.**

#### TIP

- File names are automatically assigned to log data files as follows:  
Supposing that automatic saving starts at 15:40, July 1, 2005, the file name will be (common file name prefix)\_0507011540.csv
- The full pathname of the exported CSV-formatted file must not be longer than 254 bytes.



Screen (13)

8. **Click Save.**  
⇒ The log data will be automatically saved in files.



# B5 Adjusting Registered Parameters Using Action Test

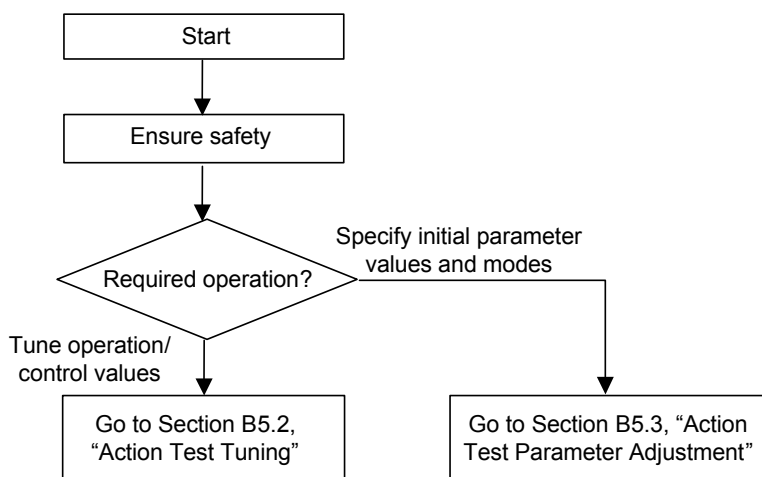
This chapter describes how to adjust registered parameters using the Action Test functions while running temperature control and monitoring modules.

- Action Test Flow → B5.1
- Action Test Tuning → B5.2
- Action Test Parameter Adjustment → B5.3

## B5.1 Action Test Flow

The Action Test feature allows for online modification of the registered parameters of temperature control and monitoring modules while running the modules. Action Test consists of two functions: Tuning and Parameter Adjustment.

- Action Test Tuning  
With the Action Test Tuning function, you can, while running and monitoring the operation of a temperature control and monitoring module, control its operation by issuing directives such as running and stopping the module, selecting a PID/SP parameter group to be used or modifying parameter values, switching to manual operation mode, starting auto-tuning, etc.
- Action Test Parameter Adjustment  
The Action Test Parameter Adjustment function is intended to be used with the Action Monitor function. With the Action Test Parameter Adjustment function, you can modify any registered parameters of a temperature control and monitoring module and then use the Action Monitor function to check how the modified parameters affect its operation. Note that modification of some registered parameters may affect other registered parameters.



### CAUTION

Do not change the system time setting of your computer when using the Action Test Tuning function. The Action Test Tuning function uses the system timer of your computer for its time management. If the system time setting of your computer is changed during tuning, the Action test may not function properly.

## B5.2 Action Test Tuning

### B5.2.1 Opening and Closing the Tuning Screen



#### CAUTION

- Although the Action Test function can continuously control and monitor a module, it is really designed for temporary module adjustment, and thus is not guaranteed to function as an operation panel for continuous process control and monitoring.
- The Action Test Tuning samples and graphs data from a module through communications. If communication channels suffer from noise or other interference, incorrect graphs may be displayed.

#### ● Opening the Tuning Screen

1. Run ToolBox, open a project, and connect online to the FA-M3 system.

#### SEE ALSO

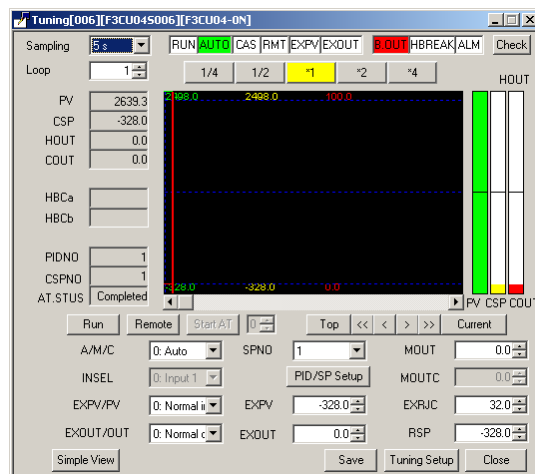
For details on how to connect online, see Section B3.1, "Connecting to FA-M3."

2. In the Debugger Window, double click [Tuning] under the relevant module name.

⇒ Screen (1) will be displayed.

#### TIP

- As an alternative way to display the Tuning screen, you may select [Debug/Maintenance]-[Action Test...] from the menu bar, and then highlight a module and click Tuning.
- The Tuning screen is displayed for the loop that was last monitored.
- Clicking Simple View will replace the current detailed screen with a simplified screen (see screen (2)).

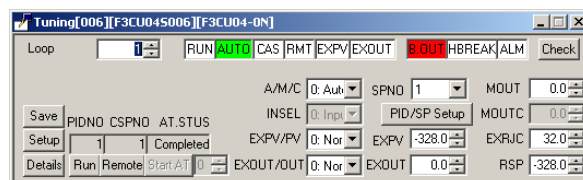


Screen (1)

#### ● Closing the Tuning Screen

3. Click Close on the Tuning screen.

⇒ The Tuning screen closes.



Screen (2)



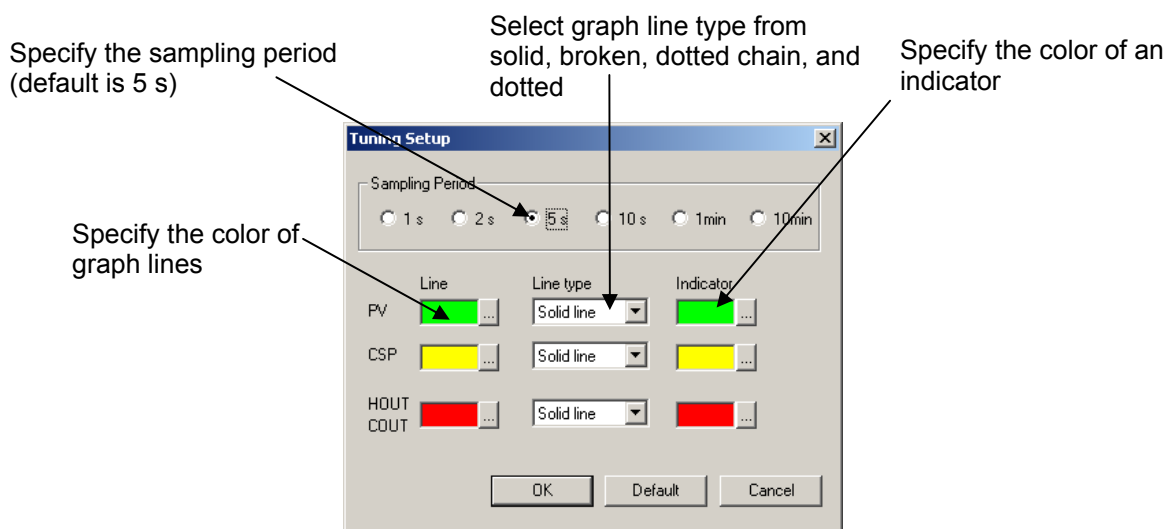
**Table B5.1 Control and Operation Parameters**

No	Symbol	Selection or Value	Remarks
a	Run	Run/stop	*
b	Remote	Remote/local	*
c	Start AT	Start/stop AT	*
d	A/M/C	Auto/manual/cascade	*
e	INSEL	Input 1/2	*
f	EXPV/PV	External/normal PV	*
g	EXOUT/OUT	External/normal output	*
h	SPNO	SP No.	
i	PID/SP Setup	PID and SP related parameters setup	
j	EXPV	External PV value	
k	EXOUT	External output value	*
l	MOUT	Manual output value	*
m	MOUTC	Manual cooling output value	*
n	EXRJC	EXRJC temperature	
o	RSP	Remote SP value	*

\* Not available with the temperature monitoring module.

## ● Tuning Setup Screen

Clicking **Tuning Setup** in the Tuning screen (see screen (1)) displays the Tuning Setup screen (see screen (3)) for setting the sampling period and the colors of graph lines and indicators.



Screen (3)

Default Tuning Settings

Parameter	Symbol	Line Color	Line Type	Indicator Color
Process value	PV	Green	Solid line	Green
Control set point	CSP	Blue	Solid line	Blue
Control output	HOUT	Red	Solid line	Red
Cooling control output	COUT	Red	Solid line	Red
Analog output setting	AOUT	Red	Solid line	Red

### TIP

Clicking **Default** resets all settings to their default.



## B5.2.2 Running and Stopping a Module

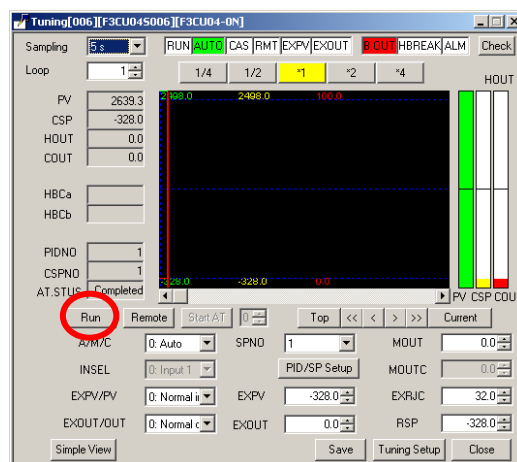
### ● Running a Module

1. In the Tuning screen (see screen (4)), click **Run** to run the module.

⇒ The screen will change to screen (5).

#### TIP

The Run button changes to the Stop button when a module is running.



Screen (4)

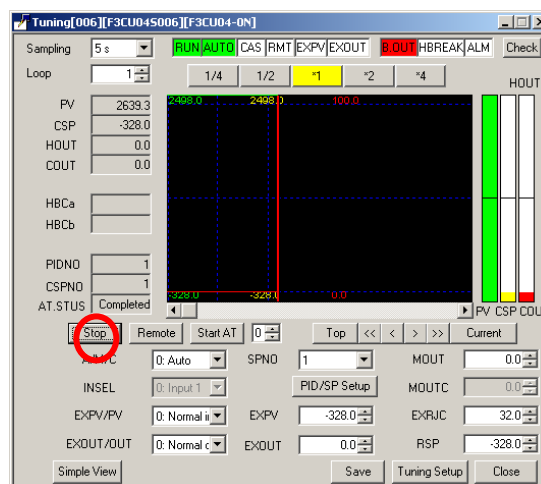
### ● Stopping a Module

2. In the Tuning screen (see screen (5)), click **Stop** to stop the module.

⇒ The screen will change to screen (4).

#### TIP

- The Stop button changes to the Run button when a module is not running.
- You may change parameters when a module not running, but any changes will be reflected only when the module is run.



Screen (5)

## B5.2.3 Tuning Individual Operation Parameters

This section describes how to tune individual operation parameters using the Action Test Tuning function. Specifically, it describes how to select the operation mode from the A/M/C list box, and how to modify individual operation parameters using the PID/SP Setup button in the Tuning screen.

### SEE ALSO

For information on other I/O related parameters, see Table B5.1.

#### ● A/M/C Switching

You can choose automatic, manual or cascade operation mode from the A/M/C list box.

- Automatic  
System performs PID computation according to the group of parameters designated by the SP No. parameter, and controls the module output automatically.
- Manual  
System does not perform PID computation according to the group of parameters designated by the SP No. parameter. Instead, the manual output (MOUT) and cooling manual output (MOUTC) parameters are used to directly control module output.
- Cascade  
System performs PID computation according to a pair of parameter groups designated by a pair of SP Nos., and controls the module output automatically.

#### ● SP Switching

You can choose from the SPNO list box an SP (PID) No. parameter for designating a group of operation parameters to be used for PID computation in automatic operation. To modify individual operation parameters, click **PID/SP Setup**.



### CAUTION

When you modify individual operation parameters for a specific SP (PID) No., a parameter setting on the Tuning screen may become out of range. In this case, further modification of individual operation parameters will not be allowed. Update the setting range by clicking the Save button in the Tuning screen.

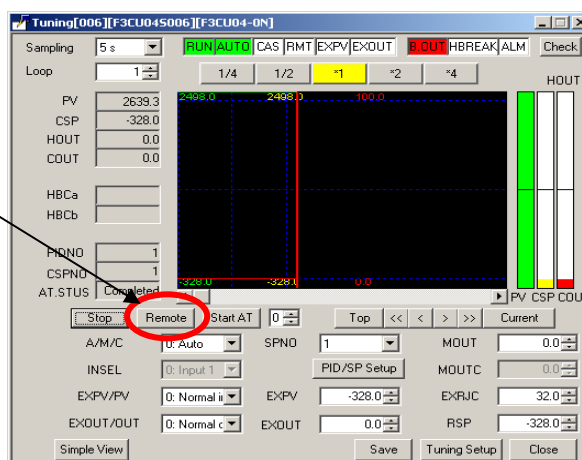
### SEE ALSO

- For information on the parameter adjustment function of the Action Test, see Section B5.3, "Action Test Parameter Adjustment."
- For details on the group of PID parameters designated by the SP No parameter, see the User's Manual for the Temperature Monitoring Module or Temperature Control and PID Module.

## B5.2.4 Changing between Remote and Local

You can toggle between remote SP and local SP by clicking **Remote** (to select remote SP) or **Local** (to select local SP).

Click **Remote** or **Local**



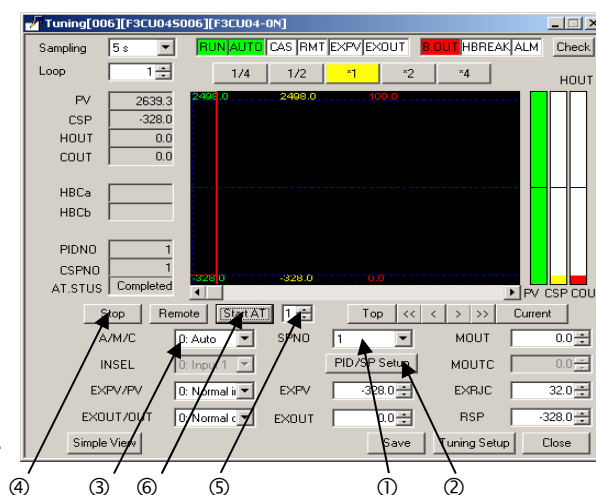
### TIP

When remote SP is selected, the **Remote** button changes to **Local**.

## B5.2.5 Action Test Auto-tuning

This section describes how to start the Action Test Auto-tuning function. In Action Test Auto-tuning, as the module runs according to a group of PID parameters designated by the SP No. parameter, PID parameters are automatically tuned for optimum module operation and the tuning results are displayed.

- ① Select an SP No. to define a group of parameters to be tuned automatically.
- ② Click **PID/SP Setup**, and modify the displayed parameters for the SP No. specified in ① as required.
- ③ Set A/M/C to Auto.
- ④ Click **Run**.
- ⑤ Select a PID/SP number to specify the group of parameters to be tuned.
- ⑥ Click **Start AT** to start auto-tuning. When auto-tuning completes, its completion status is displayed in [AT.STUS].



### TIP

When auto-tuning is in progress, the **Start AT** button changes to **Stop AT**.

## B5.2.6 Checking for Error or Alarm Conditions

You can check temperature control and monitoring modules for error or alarm conditions using the Error Status screen, which can be displayed from the Tuning screen. Module errors, and statuses of alarms as defined by operation parameters are displayed on the Error Status screen.

If any error is detected in the module, the ALM lamp in the Tuning screen turns red.

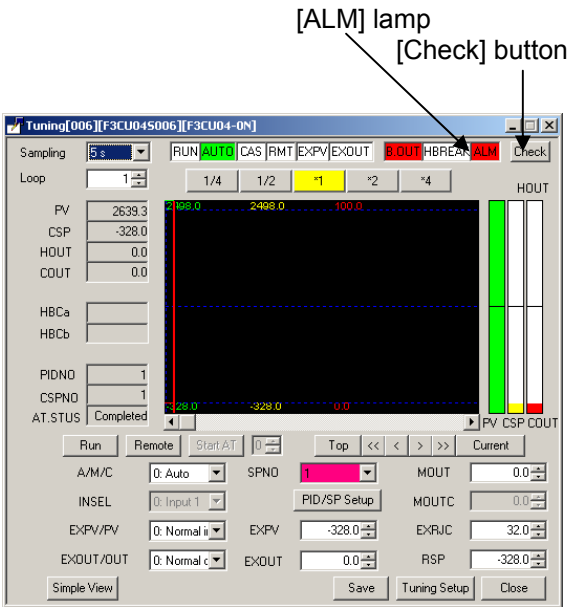
### TIP

Error conditions that may occur with a module are:  
System data error, A/D converter error, calibration value error, RJC error, controller or I/O parameter error, and EEPROM error.

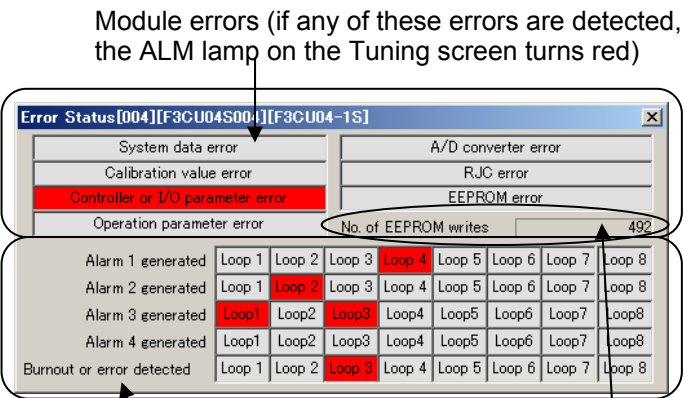
### SEE ALSO

For details on module errors, see the User's Manual for Temperature Monitoring Module or Temperature Control and PID Module.

1. Click the Check button in the Tuning screen.  
⇒ The Error Status screen will be displayed.



2. Check for any error or alarm condition on the Error Status screen.



### TIP

The EEPROM write-operation counter is displayed only for F3CU04-0S, F3CU04-1S (revision 06:05 or higher), F3CU04-0G, F3CU04-1G.

## B5.3 Action Test Parameter Adjustment

### B5.3.1 Opening the Parameter Adjustment Window

1. Run ToolBox, open a project, and connect online to the FA-M3 system.

⇒ Screen (1) will be displayed.

#### SEE ALSO

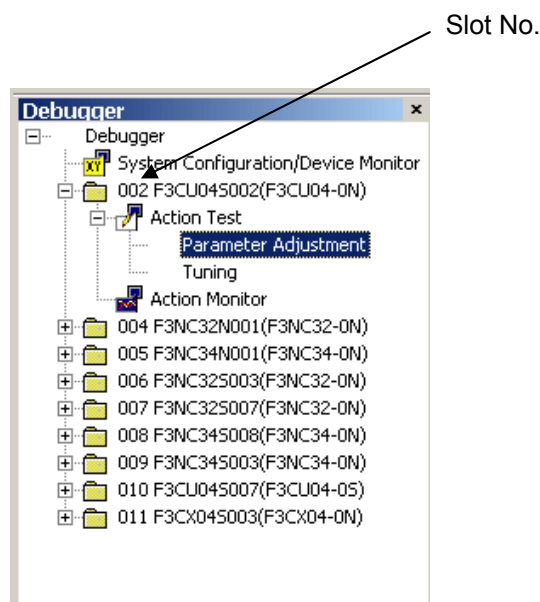
For information on how to connect online, see Section B3.1, "Connecting to FA-M3."

2. In the Debugger Window, double click [Parameter Adjustment] under the relevant module name (slot No.).

⇒ Screen (2) will be displayed.

#### TIP

You can also display the Parameter Adjustment window by selecting [Debug/Maintenance]-[Action Test...] from the menu bar, and then selecting a project.



Screen (1)

3. Click [Yes] or [No], and select a screen that contains the parameters you want to modify.

⇒ The first screen that appears depends on whether the Yes or No button is clicked:

[Yes]: Controller Parameter Setup screen

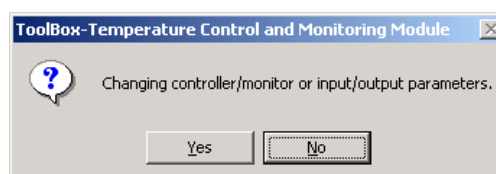
[No]: Operation Parameter Setup screen

#### TIP

If you click [No], the system presents the Operation Parameter Setup screen for editing, skipping the Controller Parameter Setup screen and Input/Output Parameter Setup screen.

#### SEE ALSO

If the NBKUP parameter is set to "1: No backup," a confirmation dialog box will appear before the Parameter Adjustment window appears. For more information, see Sections B5.3.3, "Setting Not to Save Registered Parameters," and C1.1.1, "Tables of Registered Parameters."



Screen (2)

## B5.3.2 Modifying Registered Parameters

### TIP

If the CPU operation mode of the CPU module is set to ROM Writer, registered parameters of advanced function modules cannot be updated from ToolBox. In this case, a dialog box appears to inform you of the situation. Terminate the ROM writer mode of the CPU module using WideField3 as required. The dialog box displayed is the same as that displayed at downloading. For details, see Section B3.4, "Downloading Restrictions."

1. On the Controller Parameter Setup screen (see screen (7)), highlight a register you want to modify by clicking the relevant setup cell.

⇒ The list box button will appear.

### TIP

For a temperature monitoring module, the name of the screen is "Monitor Parameter Setup" instead.

2. Click the list box button to open the list box, and select a desired setting.

### SEE ALSO

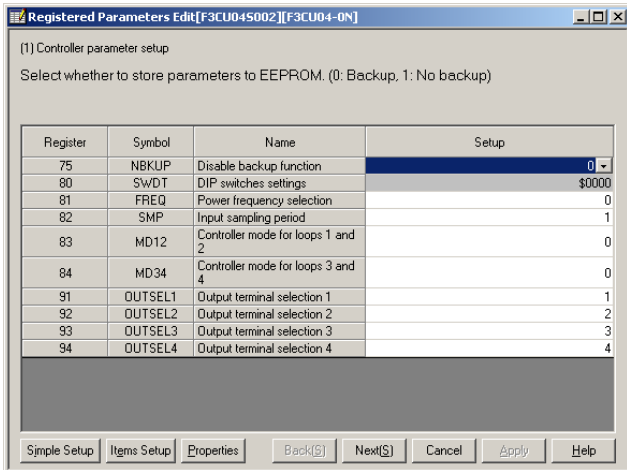
- For information on how to use a list box, see Section B2.2.4, "About Parameter Input Helper Screens."
- For information on how to use buttons on the screen, see Section B2.1.3, "Registered Parameter Setup Screens."
- For information on registered parameters, see Section C1.1.1, "Tables of Registered Parameters."

3. Click **Next**.

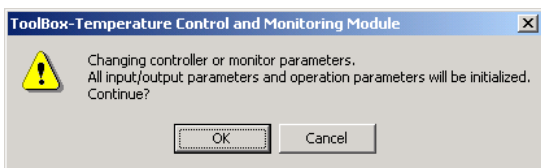
⇒ Screen (8) will be displayed.

### TIP

- Screen (8) is not displayed if no parameter has been modified.
- If you modify a parameter and click **Apply**, screen (8) is displayed but screen (7) remains. To go to Step 6, click **Next**.



Screen (7)



Screen (8)

4. Click **OK**.

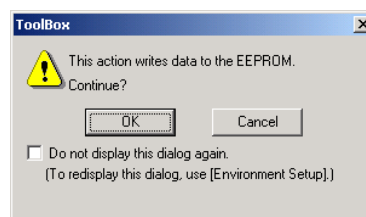
⇒ Screen (10) will be displayed.

**TIP**

Data can be written to an EEPROM up to 100,000 times.

**SEE ALSO**

If the NBKUP parameter is set to "1: No backup," screen (9) is not displayed. See Section B5.3.3, "Setting Not to Save Registered Parameters."



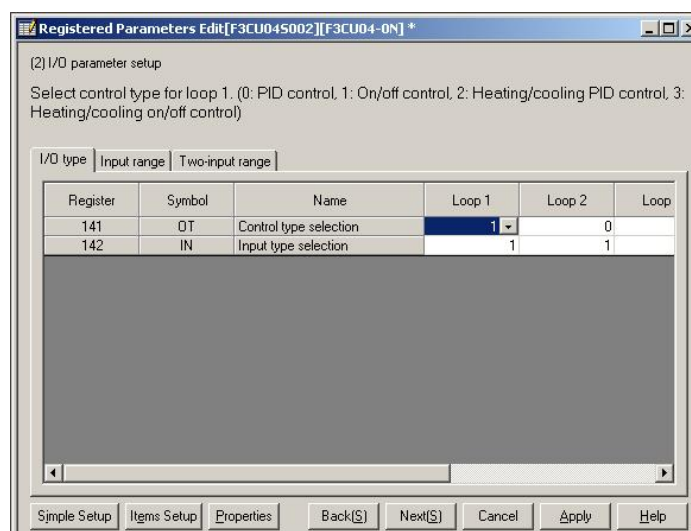
Screen (9)

5. In the I/O Parameter Setup screen (see screen (10)), highlight a register you want to modify by clicking the relevant cell.

6. Click the list box button and select a setting from a list box or specify a range.

**SEE ALSO**

- For information on how to use a list box, see Section B2.2.4, "About Parameter Input Helper Screens."
- For information on how to use buttons on the screen, see Section B2.1.3, "Registered Parameter Setup Screens."
- For information on registered parameters, see Section C1.1.1, "Tables of Registered Parameters."



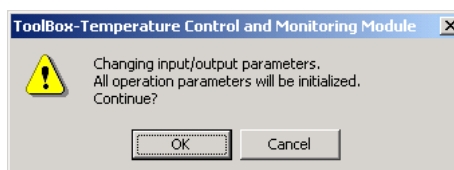
Screen (10)

7. Click **Next**.

⇒ Screen (11) will be displayed.

**TIP**

- Screen (11) is not displayed if no parameter has been modified.
- You cannot return to the Controller Parameter Setup Screen by clicking the **Back** button on the Input/Output Parameter Setup screen. To edit parameters on the Controller Parameter Setup screen, you must reopen the Controller Parameter Setup screen.



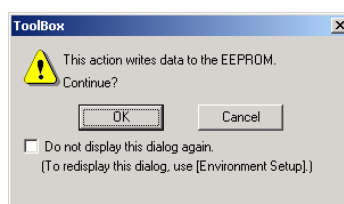
Screen (11)

8. Click **OK**.

⇒ Screen (12) will be displayed.

**TIP**

Data can be written to an EEPROM up to 100,000 times.



Screen (12)

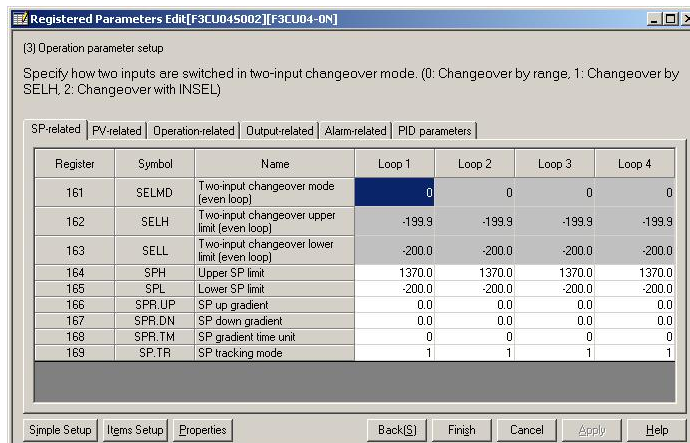
**SEE ALSO**

If the NBKUP parameter is set to "1: No backup," screen (12) is not displayed. See Section B5.3.3, "Setting Not to Save Registered Parameters."

9. In the operation Parameter Setup screen (see screen (13)), highlight a register you want to modify by clicking the relevant cell.
10. Click the list box button and select a setting from a list box or specify a range.

**SEE ALSO**

- For information on how to use a list box, see Section B2.2.4, "About Parameter Input Helper Screens."
- For information on how to use buttons on the screen, see Section B2.1.3, "Registered Parameter Setup Screens."
- For information on registered parameters, see Section C1.1.1, "Tables of Registered Parameters."



Screen (13)

11. Click **Finish**.

⇒ Screen (14) will be displayed.

**TIP**

- Screen (14) is not displayed if no parameter has been modified.
- You cannot return to the Input/output Parameter Setup Screen by clicking the **Back** button on the Operation Parameter Setup screen. To edit parameters on the Input/output Parameter Setup screen, you must reopen the Controller Parameter Setup screen.

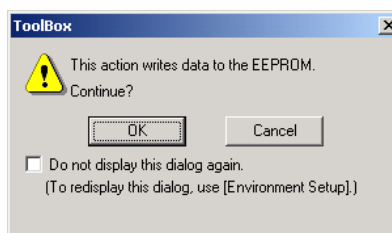
12. Click **OK**.

**TIP**

Data can be written to an EEPROM up to 100,000 times.

**SEE ALSO**

If the NBKUP parameter is set to "1: No backup," screen (14) is not displayed. See Section B5.3.3, "Setting Not to Save Registered Parameters."

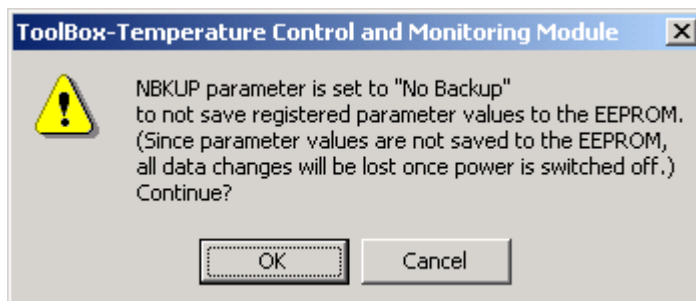


Screen (14)



### B5.3.3 Setting Not to Save Registered Parameters

If the NBKUP parameter is set to "1: No backup", when you perform a parameter adjustment or modify parameters on a parameter setup screen, ToolBox displays the following message. And, the parameter values are not saved to the EEPROM in the module. Modify the setting of the NBKUP parameter when needed.



### B5.3.4 SP Backup

When registered parameters are written in the module, a backup function of the module works and the parameter data is backed up in the internal EEPROM.

Whether or not to back up SP (set point) values depends on the specified NBKUP parameter and module types as shown in the table below.

	F3CU04-0S F3CU04-1S F3CU04-0G F3CU04-1G	F3CU04-0N F3CU04-1N F3CX04-0N F3CX04-0G
NBKUP = 0:Backup at download	Backed up to EEPROM	Backed up to EEPROM
NBKUP = 0:Backup at parameter adjustment	Not backed up to EEPROM	Backed up to EEPROM
NBKUP = 1: No backup at download	Not backed up to EEPROM	Not backed up to EEPROM
NBKUP = 1: No backup at parameter adjustment	Not backed up to EEPROM	Not backed up to EEPROM

On F3CU04-0S and F3CU04-1S, F3CU04-0G, F3CU04-1G, writing operation in the EEPROM during parameter adjustment and so on is limited, and SP values are never backed up.

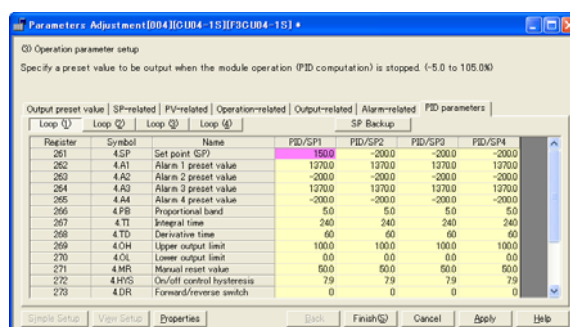
If you want to back up SP values in the EEPROM at parameter adjustment, you must do it manually.

To back up SP values manually after parameter adjustment, use the following procedure.

1. Open the Operation parameter setup screen from the Registered Parameters Edit screen.

2. Modify and update SP values.

⇒ A confirmation dialog box is displayed to confirm that you want to back up the SP values.



Screen (15)

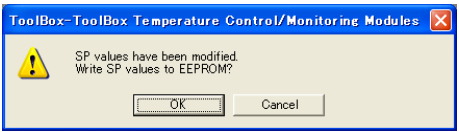
B050304\_01.VSD

3. Click [OK].

⇒ The SP values are copied to the EEPROM.

**TIP**

Even if you cancel on the confirmation dialog box in step 2 or 3, you can click the [SP Backup] button later to perform a manual backup.

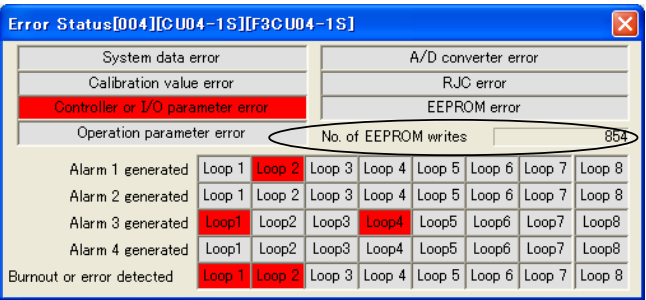


Screen (16)

B050304\_02.VSD

**TIP**

You can check the number of write operations to the EEPROM of the module in [No. of EEPROM writes] on the Error Status dialog box for the tuning function.



B050304\_03.VSD

# B6 Saving Registered Parameters to ToolBox

This chapter describes how to save tuned registered parameters from FA-M3 modules to a PC running ToolBox.

- Uploading Registered Parameters

→ B6.1

## B6.1 Uploading Registered Parameters

You can upload and save tuned registered parameters as a file on a PC. You can upload data either from individual or all modules of a project.

### B6.1.1 Uploading from Individual Modules

#### □ Uploading Directly from Advanced Function Modules

1. Run ToolBox and connect online to FA-M3.

2. Select [Online]-[Upload]-[Module...] from the menu bar.

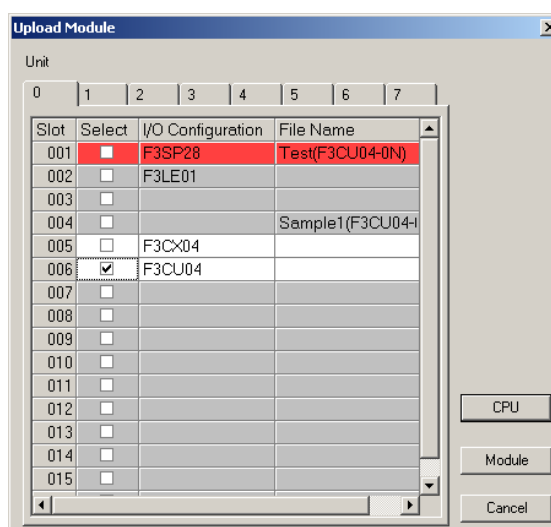
⇒ Screen (1) will be displayed.

3. Checkmark the modules from which data is to be uploaded by clicking in the Select column.

#### ● Color Codes for Availability for Uploading

Modules are color-coded to indicate their availability for uploading as follows:

- White:  
Uploading to the module is allowed.
- Red:  
Uploading is not allowed because of a mismatch between the I/O configuration and the file configuration of the module.
- Yellow:  
Uploading to the CPU module is not allowed because the address setup for the CPU module is invalid or not done.
- Gray:  
Not accessible.



Screen (1)

4. Click **Module**.

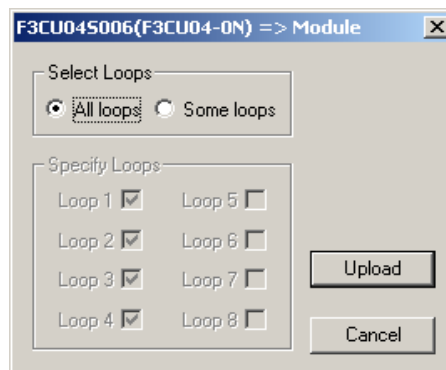
⇒ Screen (2) will be displayed.

5. Select the loops for which parameters are to be uploaded, and click **Upload**.

⇒ The Upload dialog box is displayed during uploading. When the upload is completed, it is replaced by screen (3).

### TIP

Clicking **Stop** during uploading aborts the upload process.



Screen (2)

6. When uploading completes, click **OK**.

⇒ The Results of Uploading window will be displayed.

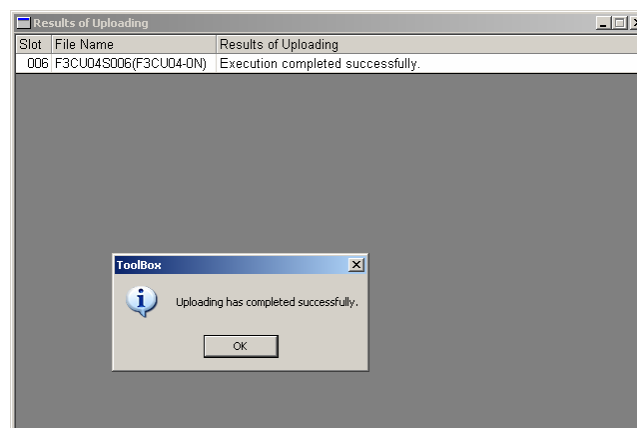
### SEE ALSO

For information on the messages on the result of uploading, see Section B6.1.3, "Messages on the Result of Uploading."

7. Save the uploaded data as a project file.

### SEE ALSO

For information on how to save uploaded data as a project file, see Section B6.1.3, "Saving Uploaded Data," of the FA-M3 ToolBox Manual.



Screen (3)

## □ Uploading from the CPU Module

1. Select [Online]-[Upload]-[Module...] from the menu bar.

⇒ Screen (4) will be displayed.

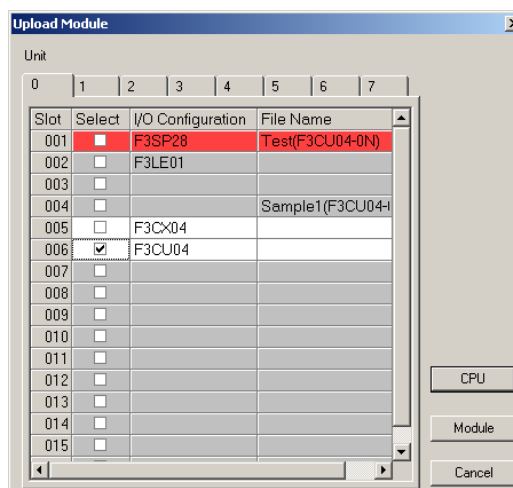
2. Checkmark the modules for which data is to be uploaded by clicking in the Select column.

### SEE ALSO

For information on the color codes of modules indicating their availability for uploading, see the description entitled “● Color Codes for Availability for Uploading” in Section B6.1.1.

3. Click **CPU**.

⇒ Screen (5) will be displayed.



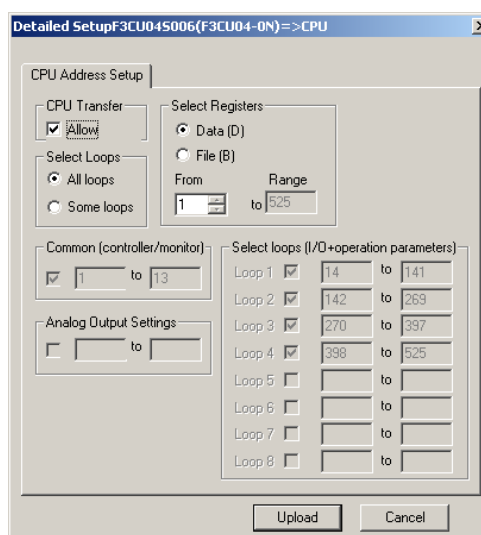
Screen (4)

4. When you have completed setup, click **Upload**.

⇒ The Upload dialog box is displayed during uploading. When uploading is completed, it is replaced by screen (6).

### TIP

Clicking **Stop** during uploading aborts the upload process.



Screen (5)

5. When uploading completes, click **OK**.  
⇒ The Results of Uploading window will be displayed.

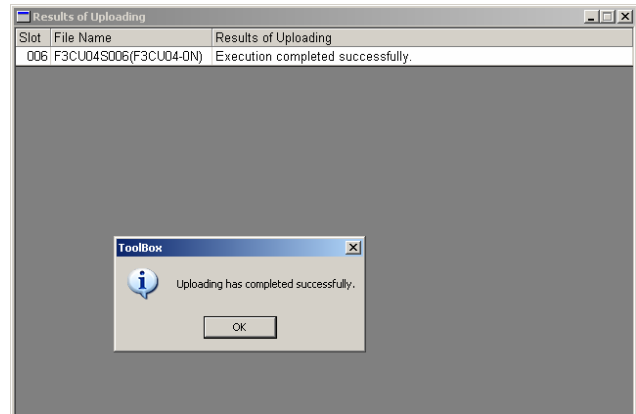
## SEE ALSO

For information on the messages on the result of uploading, see Section B6.1.3, "Messages on the Result of Uploading."

6. Save the uploaded data as a project file.

## SEE ALSO

For information on how to save uploaded data as a project file, see Section B6.1.3, "Saving Uploaded Data," of FA-M3 ToolBox Manual.



Screen (6)

## B6.1.2 Uploading from All Modules of a Project

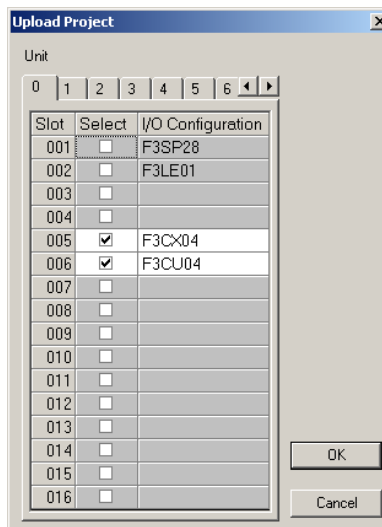
1. Select **[Online]-[Upload]-[Project...]** from the menu bar.  
⇒ Screen (7) will be displayed.

2. Click **OK**.

- ⇒ The Upload dialog box is displayed during uploading. When the upload is completed, it is replaced by screen (8).

## TIP

- If you try to perform upload when a project is open, a dialog box is displayed to confirm whether to close the currently opened project.
- Clicking **Stop** during uploading aborts the upload process.



Screen (7)

### 3. When uploading completes, click **OK**.

⇒ The Results of Uploading window will be displayed.

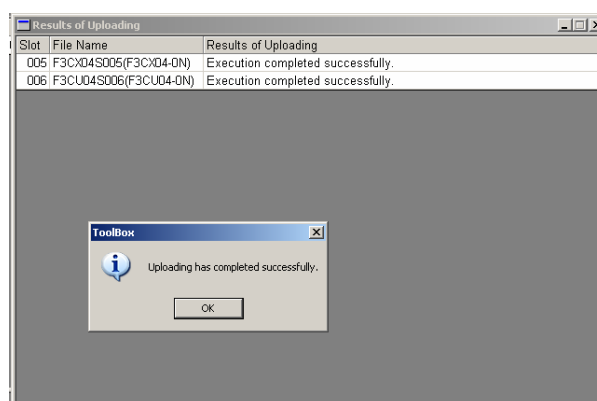
#### SEE ALSO

For information on the messages on the result of uploading, see Section B6.1.3, "Messages on the Result of Uploading."

### 4. Save the uploaded data as a project file.

#### SEE ALSO

For information on how to save uploaded data as a project file, see Section B6.1.3, "Saving Uploaded Data," of the FA-M3 ToolBox Manual.



Screen (8)

## B6.1.3 Messages on the Result of Uploading

The Results of Uploading screen may display one or more of the messages listed below. Read the messages and take necessary actions, if any.

**Table B6.1 List of Messages on the Result of Uploading**

No.	Messages	Description	Remarks
1	Execution completed successfully	Upload is successfully completed.	
2	Aborted.	The [Stop] button was pressed during uploading, and uploading was aborted.	
3	NNN parameter (9999) is invalid.	The NNN parameter value is beyond the upper or lower limit.	*1
4	Failed to read "NNN" parameter (9999).	An error has occurred when the NNN parameter is being read.	*1
5	Communication server busy	The communication server is busy. WideField3 may be communicating with FA-M3.	
6	Invalid dialog information file	Dialog information file was found to be damaged during online processing. The ToolBox environment file may have been changed by a user.	
7	Memory error	Available memory is insufficient.	

\*1 : "NNN" denotes either "Controller/Monitor," "Input/Output," or "Operation."  
 "9999" denotes the number of the register in error.  
 For details on register numbers, see Section C1.1.1, "Tables of Registered Parameters."  
 For example, the following error message may appear if uploading fails due to an error:  
 "Input/Output" parameter (147) is invalid.





# B7 Printing and Using Created Data

This chapter describes how to print or export created data.

- Printing Created Data → B7.1
- Using Created Data → B7.2

## B7.1 Printing Created Data

Ensure that a PC running ToolBox is properly configured and connected to a printer.

### SEE ALSO

For general information on printing, see Section B7.1, "Printing Created Data," of the FA-M3 ToolBox Manual.

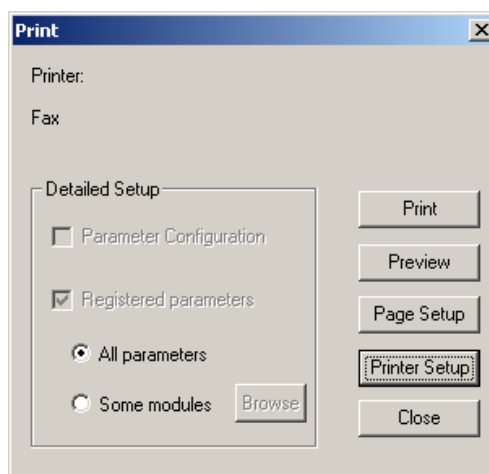
### □ Printing Registered Parameters

1. Run the ToolBox, and open a project.
2. Open the Registered Parameters Edit screen.
3. Select [File]-[Print]-[Screen] from the menu bar.  
⇒ Screen (1) will be displayed.
4. Specify whether all or some parameters are to be printed.

#### TIP

If you want to print data for only some of the modules, click the radio button next to "Some Modules," click **Browse**, and specify the modules for which parameters are to be printed.

5. Click **Preview** to preview the printout.



Screen (1)

6. Confirm the name of the selected printer, and click **OK**.
- ⇒ Parameters will be printed (see Printout (2)).

**TIP**

Each registered parameter, item, file name, and other table entry is printed on a line. If a line is too long, it will be truncated.

File name : F3CU04S006.VPUP101  
Title :  
Date Created : 2003/12/15 14:05:25  
Model : F3CU04-ON  
Number of loops : 4 loops

Controller/Monitor Parameters:

Reg.	Symbol	Item	Setup
73	NBRUP	Disable backup	0: Save
80	SWDT	DIP switches settings	00000
81	FPSQ	Power frequency select	0: 50 Hz
82	SMP	Input sampling period	1: 200 ms - loops 1
83	MDI2	Controller mode for loop	0: Two single loops
84	MDI4	Controller mode for loop	0: Two single loops
91	OUTSEL1	Output terminal select	1: Heating output 1
92	OUTSEL2	Output terminal select	2: Heating output 2
93	OUTSEL3	Output terminal select	3: Heating output 3
94	OUTSEL4	Output terminal select	4: Heating output 4

Input/output Parameters:

Reg.	Symbol	Item	Loop 1 *-1	Loop 2 *-3	Loop 3 *-5	Loop 4 *-7
*41	CP	Control type selection	1: On/off con	0: PID contro	0: PID contro	0: PID contro
*42	IN	Input type selection	1: Thermocoup	1: Thermocoup	1: Thermocoup	1: Thermocoup
*43	RH	Input range upper limit	2498.0	2498.0	2498.0	2498.0
*44	RL	Input range lower limit	-328.0	-328.0	-328.0	-328.0
*45	DEC.P	Decimal point position	1	1	1	1
*46	RH	Scaling upper limit	2498.0	2498.0	2498.0	2498.0
*47	RL	Scaling lower limit	-328.0	-328.0	-328.0	-328.0
*48	SEP	Scaling decimal point	p1	1	1	1
*49	RJC	Reference junction comp	1: On	1: On	1: On	1: On
*50	SSL	Summout selection	1: Up Scale	1: Up Scale	1: Up Scale	1: Up Scale
*51	PRK	PV range upper limit (a)	2498.0	2498.0	2498.0	2498.0
*52	REL	PV range lower limit (a)	-328.0	-328.0	-328.0	-328.0
*53	PDP	PV range decimal point	p1	1	1	1

Note: '\*' in register no. denotes 1,4,1,3 for loops 5 to 7 respectively.

Operation Parameters:

Printout (2)

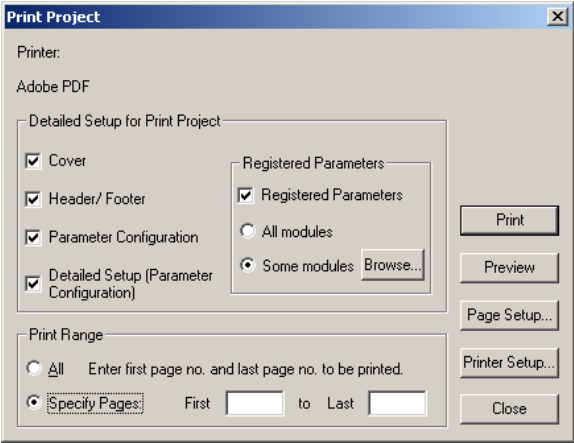
☐ **Printing a Project**

1. Run the ToolBox, and open a project to be printed.
2. Select **[File]-[Print]-[Project...]** from the menu bar.  
⇒ Screen (3) will be displayed.
3. Specify the data is to be printed. Select either or both of the options:
  - Parameter configuration  
Title, date of creation, CPU module, and parameter configuration
  - Registered parameters (for each slot No.)  
File name, module type, and CPU module (where parameters are stored)

**TIP**

If you want to print data for only some of the modules, click the radio button next to "Some Modules," click the displayed **Browse** button, and specify the modules for which data is to be printed.

4. Click **Preview** to preview the printout.



Screen (3)

5. Confirm the name of the selected printer, and click **OK**.

⇒ Data will be printed (see Printout (4)).

### TIP

Each registered parameter, item, file name, and other table entry is printed on a line. If a line is too long, it will be truncated.

Project Name : NC\_Module\_Data  
Title :  
Created on : 2007/06/13 09:54:47  
CPU Type : F3SP3-65

#### Parameter Configuration

Slot No.	File Name	Title	Type	Date
002	F3C004S002.YPWF101		F3C004-0M	2007/06/11
010	F3C004S007.YPWF105		F3C004-0S	2007/06/30
011	F3C004S003.YPWF111		F3C004-0M	2007/05/23

#### Slot No. : 02 Details

File name : F3C004S002.YPWF101  
Model : F3C004-0M

Title :

CPU Area For Controller/Monitor Parameters		CPU Area For Analog Output Parameters	
DI-D13		-	
Loop#	Input/Output Parameters	CPU Area	
		Operation Parameters	FID/SP Parameters
1	D14-D20	D27-D123	D124-D141
2	D142-D154	D155-D251	D252-D258
3	D270-D282	D283-D379	D380-D397
4	D398-D410	D411-D507	D508-D525

#### Slot No. : 10 Details

File name : F3C004S007.YPWF105  
Model : F3C004-0S

Title :

"Detailed setup not done."

#### Slot No. : 11 Details

File name : F3C004S003.YPWF111  
Model : F3C004-0M

Title :

"Detailed setup not done."

### Printout (4)

## B7.2 Using Created Data

### □ Registered Parameters File Data

You can convert and save registered parameters file data of a project into a CSV-formatted file, which you can later process using Microsoft Excel (simply Excel) or other application programs to produce various reports on registered parameters.

#### SEE ALSO

For information on how to save registered parameters in a file, see Section B7.2, "Using Created Data," of the FA-M3 ToolBox manual.

1. Run the ToolBox, and open a project.
2. Select [File]-[Export...] from the menu bar.
3. Checkmark registered parameters files to be exported by clicking the corresponding checkboxes in the Select column.
4. Click **Export**.
5. Enter a name of a destination CSV file for storing registered parameters data.

#### TIP

The full pathname of the CSV file must not be longer than 254 characters.

6. Click **Save**.  
⇒ Data will be saved as a CSV file.
7. Run Excel.
8. Select [File]-[Open...] from the menu bar.
9. Select [All Files] in the Files of Type field. All available files will be listed.
10. Double click the required file. Its content will be displayed (see Sample Content (5)).

	A	B	C
1	Project	NC_Module_Data	
2	CPU Type	F3SP67-6S	
3	Title		
4	Last Modified Date	5/30/2007	
5			
6	File	F3CU04S002	
7	Title		
8	Module type	F3CU04-0N	
9	Number of loops		4
10	Channel name		
11	Controller/Monitor Parameters:		
12	Register	Comment	Preset Value
13		75 Disable backup	0
14		80 DIP switches settings	\$0
15		81 Power frequency selection	1
16		82 Input sampling period	1
17		83 Controller mode for loops 1 and 2	2
18		84 Controller mode for loops 3 and 4	0
19		91 Output terminal selection 1	1
20		92 Output terminal selection 2	2
21		93 Output terminal selection 3	3
22		94 Output terminal selection 4	4
23	Input/output Parameters:		
24	Loop 1:		
25	Register	Comment	Preset Value
26		141 Control type selection	1
27		142 Input type selection	1
28		143 Input range upper limit	1370
29		144 Input range lower limit	-200
30		145 Decimal point position	1
31		146 Scaling upper limit	1370
32		147 Scaling lower limit	-200

Sample Content (5)

## □ Log File Data

You can use Excel or other software applications to process the log data (see screen (6)) saved using the Action Monitor function.

### SEE ALSO

For information on how to save log data using the Action Monitor function, see Section B4.2.3, "Saving Monitored Data."



Screen (6)

1. Run Excel.
  2. Select [File]-[Open...] from the menu bar.
- ⇒ Screen (7) will be displayed.

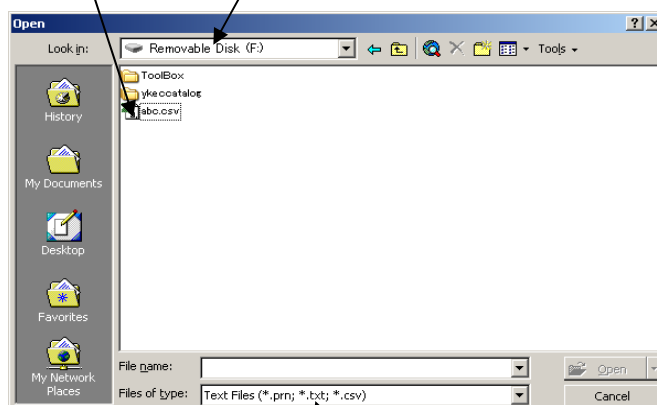
### TIP

In screen (7), log data is saved in the My Documents folder.

3. Go to the folder where you have saved log data, and select Text Files in the Files of Type field.
4. Double click the required CSV file. The content of the file will be displayed (see Sample Content (8)).

Double click the required CSV file.

Go to the folder where log data is saved.



Screen (7)

Select Text Files or All Files in the [Files of Type] field.

5. Specify the data range to be displayed. In this example, data range A6 to D40 (for two loops) is specified.

Log data point number

Logged date

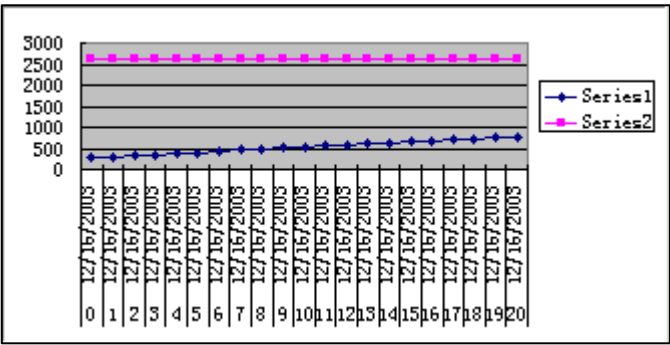
Register number, upper limit, and lower limit for log data

	A	B	C	D	E	F	G	H	I	J
1	Comp									
2	#####	12/16/2003 15:34								
3	21		5 0x000000FF							
4	1		-328 2498							
5	Point number	Acquisition time	1-PV.1	2-PV.2	3-PV.3	4-PV.4	0-FREQ	1-SPNO	2-RUN. STU	3-ERR. STU
6	0	12/16/2003 15:31	278.9	2639.3	2639.3	2639.3	0	1	6912	0
7	1	12/16/2003 15:32	303.9	2639.3	2639.3	2639.3	0	1	6912	0
8	2	12/16/2003 15:32	328.8	2639.3	2639.3	2639.3	0	1	6912	0
9	3	12/16/2003 15:32	353.8	2639.3	2639.3	2639.3	0	1	6912	0
10	4	12/16/2003 15:32	378.7	2639.3	2639.3	2639.3	0	1	6912	0
11	5	12/16/2003 15:32	403.7	2639.3	2639.3	2639.3	0	1	6912	0
12	6	12/16/2003 15:32	428.7	2639.3	2639.3	2639.3	0	1	6912	0
13	7	12/16/2003 15:32	453.7	2639.3	2639.3	2639.3	0	1	6912	0
14	8	12/16/2003 15:32	479	2639.3	2639.3	2639.3	0	1	6912	0
15	9	12/16/2003 15:32	503.6	2639.3	2639.3	2639.3	0	1	6912	0
16	10	12/16/2003 15:32	529	2639.3	2639.3	2639.3	0	1	6912	0
17	11	12/16/2003 15:32	554	2639.3	2639.3	2639.3	0	1	6912	0
18	12	12/16/2003 15:32	578.9	2639.3	2639.3	2639.3	0	1	6912	0
19	13	12/16/2003 15:33	603.9	2639.3	2639.3	2639.3	0	1	6912	0
20	14	12/16/2003 15:33	628.9	2639.3	2639.3	2639.3	0	1	6912	0
21	15	12/16/2003 15:33	653.9	2639.3	2639.3	2639.3	0	1	6912	0
22	16	12/16/2003 15:33	678.8	2639.3	2639.3	2639.3	0	1	6912	0
23	17	12/16/2003 15:33	703.8	2639.3	2639.3	2639.3	0	1	6912	0
24	18	12/16/2003 15:33	728.7	2639.3	2639.3	2639.3	0	1	6912	0
25	19	12/16/2003 15:33	753.7	2639.3	2639.3	2639.3	0	1	6912	0
26	20	12/16/2003 15:33	778.6	2639.3	2639.3	2639.3	0	1	6912	0

Sample Content (6)

Log data 1-8

6. Select [Insert]-[Chart...] from the menu bar.
7. In the [Standard Types] tab, select Line as a chart type, select a chart sub-type, and click **Finish**.
- ⇒ The log data will be displayed as a chart (see Sample Display (9)).



Sample Display (9)

# C1 Technical Information

This chapter lists ToolBox registered parameters, common process data, registers used for tuning, and CPU parameter positions.

• Registers

→ C1.1

## C1.1 Registers

### C1.1.1 Tables of Registered Parameters

The FA-M3 ToolBox for Temperature Control and Monitoring Modules supports the following advanced function modules:

F3CU04-0S, -0N, -0G: Temperature Control and PID Module with four inputs/outputs

F3CU04-1S, -1N, -1G: Temperature Control and PID Module with four inputs/outputs plus continuous analog output

F3CX04-0N, -0G: Temperature Monitoring Module with four inputs

#### □ Controller/Monitor Parameters

No.	Symbol	Description	Data Range	Default Value				
				F3CU04				F3CX04
				-0S, -0G	-0N	-1S, -1G	-1N	-0N, -0G
75	NBKUP	Disable backup function	0: Backup, 1: No backup	0	0	0	0	0
77	EEP.CNTR	Counter for the number of write operations to the EEPROM	Number of write operations to the EEPROM	0		0		
78								
80	SWDT	DIP switches settings	Hexadecimal value (\$XXXX)	\$0000	\$0000	\$0000	\$0000	\$0000
81	FREQ	Power frequency selection	0: 50 Hz, 1: 60 Hz	0	0	0	0	0
82	SMP	Input sampling period	0: 100 ms - only loops 1 & 2 configurable 1: 200 ms - loops 1 to 4 configurable	1	1	1	1	1
83	MD12	Controller mode for loops 1 and 2	0: Two single loops 1: Two-input changeover control 2: Cascade control 3: Single loop (odd-numbered loops disabled)	0	0	0	0	0
84	MD34	Controller mode for loops 3 and 4	4: Both loops disabled	0	0	0	0	0
87	OUTPUT	Output type selection	Hexadecimal value (\$XXXX) for bit control where an ON bit means analog output bit 0 for output 1, bit 4 for output 5 bit 1 for output 2, bit 5 for output 6 bit 2 for output 3, bit 6 for output 7 bit 3 for output 4, bit 7 for output 8			\$0000	\$0000	
91	OUTSEL1	Output terminal selection 1	1-4: Heating outputs 1-4 11-14: Cooling outputs 1-4 21-28: Output preset values 1-8	1	1	1	1	
92	OUTSEL2	Output terminal selection 2		2	2	2	2	
93	OUTSEL3	Output terminal selection 3		3	3	3	3	
94	OUTSEL4	Output terminal selection 4		4	4	4	4	
95	OUTSEL5	Output terminal selection 5				11	11	
96	OUTSEL6	Output terminal selection 6				12	12	
97	OUTSEL7	Output terminal selection 7				13	13	
98	OUTSEL8	Output terminal selection 8				14	14	

#### TIP

- Shaded rows indicate parameters displayed in the Simple Setup screen by default.
- Parameters with no default value indicated for a module are unavailable in that module.

## □ Output Preset Values

No.	Symbol	Description	Data Range	Default Value				
				F3CU04				F3CX04
				-0S, -0G	-0N	-1S, -1G	-1N	-0N, -0G
61	AOUT1	Output preset value 1	-500 to 10500 (-5.00 to 105.00%)	-	-	0	0	-
62	AOUT2	Output preset value 2		-	-	0	0	-
63	AOUT3	Output preset value 3		-	-	0	0	-
64	AOUT4	Output preset value 4		-	-	0	0	-
65	AOUT5	Output preset value 5		-	-	0	0	-
66	AOUT6	Output preset value 6		-	-	0	0	-
67	AOUT7	Output preset value 7		-	-	0	0	-
68	AOUT8	Output preset value 8		-	-	0	0	-

## □ I/O Parameters

Input/Output Type Parameters									
Loops				Symbol	Description	Data Range	Default Value		
1	2	3	4				F3CU04-0S F3CU04-0N F3CU04-0G	F3CU04-1S F3CU04-1N F3CU04-1G	F3CX04-0N F3CX04-0G
141	341	541	741	OT	Control type selection (available only for even-numbered loops if two-input changeover or cascade control mode is selected)	0: PID control 1: On/off control 2: Heating/cooling PID control 3: Heating/cooling on/off control	0	0	
142	342	542	742	IN	Input type selection	See the Instrument Range and Accuracy table in the User's Manual for individual modules.	-	-	-
Input Range Parameters									
143	343	543	743	RH	Input range upper limit	See the Instrument Range and Accuracy table in the User's Manual for individual modules.	-	-	-
144	344	544	744	RL	Input range lower limit		-	-	-
145	345	545	745	DEC.P	Decimal point position		-	-	-
146	346	546	746	SH	Scaling upper limit	-30000 to 30000 (changeable only for DCV input type, otherwise fixed to RH/RL)	DCV: 1000; Others: RH	DCV: 1000; Others: RH	DCV: 1000; Others: RH
147	347	547	747	SL	Scaling lower limit		DCV: 0; Others: RL	DCV: 0; Others: RL	DCV: 0; Others: RL
148	348	548	748	SDP	Scaling decimal point position	0 to 4 (changeable only for DCV input type, otherwise fixed to DEC.P)	DCV: 1; Others: DEC.P	DCV: 1; Others: DEC.P	DCV: 1; Others: DEC.P
149	349	549	749	RJC	Reference junction compensation	0: Fixed value (EXJCT), 1: On	1	1	1
150	350	550	750	BSL	Burnout selection	0: Off, 1: Up Scale, 2: Down Scale	1	1	1
Two-input Range Parameters (available only in two-input changeover mode)									
151	351	551	751	PRH	PV range upper limit (available only for even-numbered loops in two-input changeover mode)	-30000 to 30000 provided $0 < (SH - SL) \leq 30000$ (changeable only for even-numbered loops in two-input changeover mode with a maximum resolution of 14 bits (16384), otherwise fixed to SH/SL)	SH	SH	SH
152	352	552	752	PRL	PV range lower limit (available only for even-numbered loops in two-input changeover mode)		SL	SL	SL
153	353	553	753	PDP	PV range decimal point position (available only for even-numbered loops in two-input changeover mode)	0 to 4 (changeable only in two-input changeover mode, otherwise fixed to SH/SL)	SDP	SDP	SDP



## □ Operation Parameters

SP-related Parameters									
Loops				Symbol	Description	Data Range	Default Value		
1	2	3	4				F3CU04-0S F3CU04-0N F3CU04-0G	F3CU04-1S F3CU04-1N F3CU04-1G	F3CX04-0N F3CX04-0G
161	361	561	761	SELMD	Two-input changeover mode (available only for even-numbered loops)	0: Changeover by temperature range 1: Changeover by SELH 2: Changeover with INSEL	0	0	0
162	362	562	762	SELH	Two-input changeover upper limit (available only for even-numbered loops)	PRL to PRH if SELL < SELH; if SELL ≥ SELH, changeover occurs with respect to SELH	PRL+1	PRL+1	PRL+1
163	363	563	763	SELL	Two-input changeover lower limit (available only for even-numbered loops)		PRL	PRL	PRL
164	364	564	764	SPH	Upper SP limit	PRL to PRH if SPL < SPH; If SPL ≥ SPH, fixed to SPL	PRH	PRH	
165	365	565	765	SPL	Lower SP limit		PRL	PRL	
166	366	566	766	SPR.UP	SP up gradient	0: Disabled	0	0	
167	367	567	767	SPR.DN	SP down gradient	0 to (PRH - PRL)	0	0	
168	368	568	768	SPR.TM	SP gradient time unit	0: Hour, 1: Minute	0	0	
169	369	569	769	SP.TR	SP tracking mode	0: Tracking On 1: Tracking Off	1	1	
PV-related Parameters									
171	371	571	771	BS	Fixed bias	-(SH - SL) to (SH - SL)	0	0	0
172	372	572	772	FL	Input filter	0: Off, 1-120 seconds	0	0	0
173	373	573	773	X1	Broken line input 1	-5.0 to 105% of (SH - SL)	SL	SL	SL
174	374	574	774	Y1	Broken line bias 1	-(SH - SL) to (SH - SL)	0	0	0
175	375	575	775	X2	Broken line input 2	-5.0 to 105% of (SH - SL)	SL	SL	SL
176	376	576	776	Y2	Broken line bias 2	-(SH - SL) to (SH - SL)	0	0	0
177	377	577	777	X3	Broken line input 3	-5.0 to 105% of (SH - SL)	SL	SL	SL
178	378	578	778	Y3	Broken line bias 3	-(SH - SL) to (SH - SL)	0	0	0
179	379	579	779	SR	Square root extraction	0: Off (no square root extraction) 1: On (square root extraction)	0	0	0
180	380	580	780	LC	Low-cut	0.0 to 5.0% of 0 to (SH - SL)	(PRH - PRL) x 0.5%	(PRH - PRL) x 0.5%	(PRH - PRL) x 0.5%
Operation-related Parameters									
181	381	581	781	SELF	Dynamic auto-tuning enable	0: Disabled, 1: Enabled	0	0	
182	382	582	782	SC	"Super" (overshoot suppression) enable code	0: Disabled, 1: Enabled	0	0	
183	383	583	783	ARW	ARW setting	0: Automatic, 50 to 200%	0	0	
184	384	584	784	CMD	Control mode	0: Standard PID control 1: Fixed-point control	0	0	
185	385	585	785	ZONE	Zone PID selection	0: Disabled, 1: Enabled	0	0	
186	386	586	786	1RP	Reference point 1	PRL to PRH	PRL	PRL	
187	387	587	787	2RP	Reference point 2		PRL	PRL	
188	388	588	788	RHY	Zone switching hysteresis	0 to (PRH - PRL)	(PRH - PRL) x 0.5%	(PRH - PRL) x 0.5%	
189	389	589	789	RDV	Reference deviation	0: Off, 0 to (PRH - PRL)	0	0	
Output-related Parameters									
191	391	591	791	CT	Cycle time	5 (0.5 s) to 1200 (120.0 s) in multiples of 5 (0.5 s)	30.0 s	30.0 s	
192	392	592	792	CTc	Cooling cycle time				
193	393	593	793	MVR	Rate-of-change limit	0: Off 1 to 1000 (0.1 to 100.0%/s)	0	0	

PID/SP1 Parameters									
Loops				Symbol	Description	Data Range	Default Value		
1	2	3	4				F3CU04-0S F3CU04-0N F3CU04-0G	F3CU04-1S F3CU04-1N F3CU04-1G	F3CX04-0N F3CX04-0G
201	401	601	801	1.SP	Set point (SP)	PRL to PRH	PRL	PRL	
202	402	602	802	1.A1	Alarm 1 preset value	-30000 to 30000	PRH	PRH	PRH
203	403	603	803	1.A2	Alarm 2 preset value		PRL	PRL	PRL
204	404	604	804	1.A3	Alarm 3 preset value		PRH	PRH	PRH
205	405	605	805	1.A4	Alarm 4 preset value		PRL	PRL	PRL
206	406	606	806	1.PB	Proportional band	1 to 9999 (0.1 to 999.9%)	5.00%	5.00%	
207	407	607	807	1.TI	Integral time	0: Off 1 to 6000 (1 to 6000 s)	240 s	240 s	
208	408	608	808	1.TD	Derivative time		60 s	60 s	
209	409	609	809	1.OH	Upper output limit	-5.0 to 105.0% if OL < OH; Fixed to OL if OL ≥ OH	100.00%	100.00%	
210	410	610	810	1.OL	Lower output limit		0.00%	0.00%	
211	413	625	817	1.MR	Manual reset value	-5.0 to 105.0%	50.0%	50.0%	
212	412	612	812	1.HYS	On/off control hysteresis	0 to (PRH - PRL)	(PRH - PRL) x 0.5%	(PRH - PRL) x 0.5%	
213	413	613	813	1.DR	Forward/reverse switch	0: Reverse operation, 1: Forward operation (fixed to 0: reverse operation in heating/cooling control mode)	0	0	
214	414	614	814	1.GAIN.C	Cooling gain	1 to 999 (1-999%)	100	100	
215	415	615	815	1.HYS.C	Cooling on/off control hysteresis	0 to (PRH - PRL)	(PRH - PRL) x 0.5%	(PRH - PRL) x 0.5%	
216	416	616	816	1.DB	Dead band	For heating/cooling on/off control: -50.0 to 50.0% of 0 to (PRH - PRL) For others: -10.0 to 10.0% of 0 to (PRH - PRL) but limited within ± PB in PID computation	0	0	
217	417	617	817	1.POUT	Preset output	-5.0 to 105.0%	0	0	
218	418	618	818	1.POUT.C	Cooling preset output	-5.0 to 105.0%	0	0	
PID/SP2 Parameters									
221	421	621	821	2.SP	Set point (SP)	PRL to PRH	PRL	PRL	
222	422	622	822	2.A1	Alarm 1 preset value	-30000 to 30000	PRH	PRH	PRH
223	423	623	823	2.A2	Alarm 2 preset value		PRL	PRL	PRL
224	424	624	824	2.A3	Alarm 3 preset value		PRH	PRH	PRH
225	425	625	825	2.A4	Alarm 4 preset value		PRL	PRL	PRL
226	426	626	826	2.PB	Proportional band	1 to 9999 (0.1 to 999.9%)	5.00%	5.00%	
227	427	627	827	2.TI	Integral time	0: Off 1 to 6000 (1 to 6000 s)	240 s	240 s	
228	428	628	828	2.TD	Derivative time		60 s	60 s	
229	429	629	829	2.OH	Upper output limit	-5.0 to 105.0% if OL < OH; if OL ≥ OH, fixed to OL	100.00%	100.00%	
230	430	630	830	2.OL	Lower output limit		0.00%	0.00%	
231	431	631	831	2.MR	Manual reset value	-5.0 to 105.0%	50.0%	50.0%	
232	432	632	832	2.HYS	On/off control hysteresis	0 to (PRH - PRL)	(PRH - PRL) x 0.5%	(PRH - PRL) x 0.5%	
233	433	633	833	2.DR	Forward/reverse switch	0: Reverse operation, 1: Forward operation (fixed to 0: reverse operation in heating/cooling control mode)	0	0	
234	434	634	834	2.GAIN.C	Cooling gain	1 to 999 (1-999%)	100	100	
235	435	635	835	2.HYS.C	Cooling on/off control hysteresis	0 to (PRH - PRL)	(PRH - PRL) x 0.5%	(PRH - PRL) x 0.5%	
236	436	636	836	2.DB	Dead band	For heating/cooling on/off control: -50.0 to 50.0% of 0 to (PRH - PRL) For others: -10.0 to 10.0% of 0 to (PRH - PRL) but limited within ± PB in PID computation	0	0	
237	437	637	837	2.POUT	Preset output	-5.0 to 105.0%	0	0	
238	438	638	838	2.POUT.C	Cooling preset output	-5.0 to 105.0%	0	0	

PID/SP3 Parameters									
241	441	641	841	3.SP	Set point (SP)	PRL to PRH	PRL	PRL	
242	442	642	842	3.A1	Alarm 1 preset value	-30000 to 30000	PRH	PRH	PRH
243	443	643	843	3.A2	Alarm 2 preset value		PRL	PRL	PRL
244	444	644	844	3.A3	Alarm 3 preset value		PRH	PRH	PRH
245	445	645	845	3.A4	Alarm 4 preset value		PRL	PRL	PRL
246	446	646	846	3.PB	Proportional band	1 to 9999 (0.1 to 999.9%)	5.00%	5.00%	
247	447	647	847	3.TI	Integral time	0: Off 1 to 6000 (1 to 6000 s)	240 s	240 s	
248	448	648	848	3.TD	Derivative time		60 s	60 s	
249	449	649	849	3.OH	Upper output limit	-5.0 to 105.0% if OL < OH; Fixed to OL if OL ≥ OH	100.00%	100.00%	
250	450	650	850	3.OL	Lower output limit		0.00%	0.00%	
251	451	651	851	3.MR	Manual reset value	-5.0 to 105.0%	50.0%	50.0%	
252	452	652	852	3.HYS	On/off control hysteresis	0 to (PRH - PRL)	(PRH - PRL) x 0.5%	(PRH - PRL) x 0.5%	
253	453	653	853	3.DR	Forward/reverse switch	0: Reverse operation, 1: Forward operation (fixed to 0: reverse operation in heating/cooling control mode)	0	0	
254	454	654	854	3.GAIN.C	Cooling gain	1 to 999 (1-999%)	100	100	
255	355	655	855	3.HYS.C	Cooling on/off control hysteresis	0 to (PRH - PRL)	(PRH - PRL) x 0.5%	(PRH - PRL) x 0.5%	
256	456	656	856	3.DB	Dead band	For heating/cooling on/off control: -50.0 to 50.0% of 0 to (PRH - PRL) For others: -10.0 to 10.0% of 0 to (PRH - PRL) but limited within ± PB in PID computation	0	0	
257	457	657	857	3.POUT	Preset output	-5.0 to 105.0%	0	0	
258	458	658	858	3.POUT.C	Cooling preset output	-5.0 to 105.0%	0	0	
PID/SP4 Parameters									
261	461	661	861	4.SP	Set point (SP)	PRL to PRH	PRL	PRL	
262	462	662	862	4.A1	Alarm 1 preset value	-30000 to 30000	PRH	PRH	PRH
263	463	663	863	4.A2	Alarm 2 preset value		PRL	PRL	PRL
264	464	664	864	4.A3	Alarm 3 preset value		PRH	PRH	PRH
265	465	665	865	4.A4	Alarm 4 preset value		PRL	PRL	PRL
266	466	666	866	4.PB	Proportional band	1 to 9999 (0.1 to 999.9%)	5.00%	5.00%	
267	467	667	867	4.TI	Integral time	0: Off 1 to 6000 (1 to 6000 s)	240 s	240 s	
268	468	668	868	4.TD	Derivative time		60 s	60 s	
269	469	669	869	4.OH	Upper output limit	-5.0 to 105.0% if OL < OH; Fixed to OL if OL ≥ OH	100.00%	100.00%	
270	470	670	870	4.OL	Lower output limit		0.00%	0.00%	
271	471	671	871	4.MR	Manual reset value	-5.0 to 105.0%	50.0%	50.0%	
272	472	672	872	4.HYS	On/off control hysteresis	0 to (PRH - PRL)	(PRH - PRL) x 0.5%	(PRH - PRL) x 0.5%	
273	473	673	873	4.DR	Forward/reverse switch	0: Reverse operation, 1: Forward operation (fixed to 0: reverse operation in heating/cooling control mode)	0	0	
274	474	674	874	4.GAIN.C	Cooling gain	1 to 999 (1-999%)	100	100	
275	475	675	875	4.HYS.C	Cooling on/off control hysteresis	0 to (PRH - PRL)	(PRH - PRL) x 0.5%	(PRH - PRL) x 0.5%	
276	476	676	876	4.DB	Dead band	For heating/cooling on/off control: -50.0 to 50.0% of 0 to (PRH - PRL) For others: -10.0 to 10.0% of 0 to (PRH - PRL) but limited within ± PB in PID computation	0	0	
277	477	677	877	4.POUT	Preset output	-5.0 to 105.0%	0	0	
278	478	678	878	4.POUT.C	Cooling preset output	-5.0 to 105.0%	0	0	

Alarm-related Parameters									
281	481	681	881	AL1	Alarm 1 type	0: Off 1: Upper limit 2: Lower limit 3: Upper deviation limit 4: Lower deviation limit 7: Upper/lower deviation limit 8: Deviation range 11: Upper limit with waiting 12: Lower limit with waiting 13: Upper deviation limit with waiting	1: Upper limit	1: Upper limit	1: Upper limit
282	482	682	882	AL2	Alarm 2 type	14: Lower deviation limit with waiting	2: Lower limit	2: Lower limit	2: Lower limit
283	483	683	883	AL3	Alarm 3 type	17: Upper/lower deviation limit with waiting	1: Upper limit	1: Upper limit	1: Upper limit
284	484	684	884	AL4	Alarm 4 type	18: Deviation range with waiting	2: Lower limit	2: Lower limit	2: Lower limit
285	485	685	885	HY1	Alarm 1 hysteresis	0 to (PRH - PRL)	(PRH-PRL) x 0.5%	(PRH-PRL) x 0.5%	(PRH-PRL) x 0.5%
286	486	686	886	HY2	Alarm 2 hysteresis				
287	487	687	887	HY3	Alarm 3 hysteresis				
288	488	688	888	HY4	Alarm 4 hysteresis				
289	489	689	889	DLY1	Alarm 1 ON delay	0 to 999 s	0	0	0
290	490	690	890	DLY2	Alarm 2 ON delay				
291	491	691	891	DLY3	Alarm 3 ON delay				
292	492	692	892	DLY4	Alarm 4 ON delay				

## C1.1.2 Common Process Data

Loops				Symbol	Description	Data Range
1	2	3	4			
1	2	3	4	PV*	Process value	0.0 to 100.0% of (PRH - PRL)
11	12	13	14	CSP*	Control set point	0.0 to 100.0% of (PRH - PRL)
21	22	23	24	HOUT.*	Control output	For single output:: OL to OH For heating/cooling output: 0 to OH
31	32	33	34	COU.*	Cooling control output	0 to OL
41	42	43	44	RUN.STUS.*	Operating status	Hexadecimal value for bit on/off control
51	52	53	54	ERR.STUS.*	Error status	Hexadecimal value for bit on/off control

\*: A loop number between 1 and 4

Shaded rows do not apply to F3CX04-0N, F3CX04-0G.

## C1.1.3 Registers Used for Tuning

Loops				Symbol	Description	Data Range
1	2	3	4			
101	301	501	701	PVIN	Input process value	SL to SH
102	302	502	702	PV	Process value	PRL to PRH
103	303	503	703	CSP	Control set point	PRL to PRH
104	304	504	704	HOUT	Control output (available for single or heating/cooling output)	For single output:: OL to OH For heating/cooling output: 0 to OH
105	305	505	705	COU	Cooling control output (available for heating/cooling output only)	0 to OL
106	306	506	706	PIDNO	Current PID number	1 to 4
107	307	507	707	CSPNO	Current SP number	1 to 4
108	308	508	708	RUN.STUS	Operating status	Hexadecimal value for bit on/off control
109	309	509	709	ALM.STUS	Alarm status	Hexadecimal value for bit on/off control
110	310	510	710	ERR.STUS	Error status	Hexadecimal value for bit on/off control
111	311	511	711	AT.STUS	Auto-tuning status	0: Normal exit, at power up, or in setup mode 1: Executing 2: Manually stopped (with AT = 0) 3: Error exit Error exit occurs if: Normal exit does not occur within 24 hours; Input burnout occurs; ADC error occurs; RUN/STP is set to STP; A/M/C is not set to auto when not in cascade control; A/M/C is not set to cascade for primary loop in cascade control; or A/M/C is not set to auto for secondary loop in cascade control
121	321	521	721	RUN/STP	Run/stop selection	0: Stop, 1: Run
122	322	522	722	A/M/C	Automatic/manual/cascade selection (the A/M/C register for an odd-numbered loop is not used in cascade mode)	0: Automatic, 1: Manual, 2: Cascade
123	323	523	723	INSEL	Input selection	0: Input 1, 1: Input 2
124	324	524	724	RMT/LOC	Remote/local selection	0: Local, 1: Remote
125	325	525	725	EXPV/PV	External/normal input selection	0: Normal input, 1: External input
126	326	526	726	EXOUT/OUT	External/normal output selection	0: Normal output, 1: External output
127	327	527	727	AT	Start auto-tuning	0: Stop AT, 1-5: Start AT (reverts to zero when auto-tuning completes)
128	328	528	728	SPNO	SP number selection	1-4
131	331	531	731	EXPV	External input	-5.0 to 105.0% of (SH - SL)
132	332	532	732	EXRJC	Reference junction temperature (available when RJC is set to 0)	-100 to 700 (-10.0 to 70.0°C) for Celsius, or 140 to 1580 (14.0 to 158.0°F) for Fahrenheit
133	333	533	733	RSP	Remote set point	PRL to PRH
134	334	534	734	MOUT	Manual output (for single or heating output)	OL to OH for PID control single output, 0.0% to OH for PID control heating/cooling output, 0.0 or 100.0% for on/off control. MOUT is automatically limited within the range.
135	335	535	735	MOUTC	Manual cooling output (available when heating/cooling is selected)	0.0% to OL for PID control heating/cooling output, 0.0 or 100.0% for on/off control. MOUTC is automatically limited within the range.
136	336	536	736	EXOUT	External output	-5.0 to 105.0%

Shaded rows do not apply to F3CX04-0N, F3CX04-0G.

## C1.1.4 CPU Parameter Positions

When downloaded to the CPU module, registered parameters are stored at CPU parameter positions shown in the tables below. The table shows addresses relative to the starting address of the destination for individual advanced function module.

Example: If the starting address for the destination is D0001, the OUTSEL1 parameter for F3CU04-0N is stored at relative address 9, or at absolute address D0010 (= D0001 + 9).

### □ Controller/Monitor Parameters

No.	Symbol	Description	F3CU04-0S F3CU04-0N F3CU04-0G	F3CU04-1S F3CU04-1N F3CU04-1G	F3CX04-0N F3CX04-0G
75	NBKUP	Disable backup function	0	0	0
80	SWDT	DIP switches settings	1	1	1
81	FREQ	Power frequency selection	2	2	2
82	SMP	Input sampling period	3	3	3
83	MD12	Controller mode for loops 1 and 2	4	4	4
84	MD34	Controller mode for loops 3 and 4	5	5	5
87	OUTPUT	Output type selection	-	6	-
91	OUTSEL1	Output terminal selection 1	9	10	-
92	OUTSEL2	Output terminal selection 2	10	11	-
93	OUTSEL3	Output terminal selection 3	11	12	-
94	OUTSEL4	Output terminal selection 4	12	13	-
95	OUTSEL5	Output terminal selection 5	-	14	-
96	OUTSEL6	Output terminal selection 6	-	15	-
97	OUTSEL7	Output terminal selection 7	-	16	-
98	OUTSEL8	Output terminal selection 8	-	17	-

### □ Output Preset Values

No.	Symbol	Description	F3CU04-0S F3CU04-0N F3CU04-0G	F3CU04-1S F3CU04-1N F3CU04-1G	F3CX04-0N F3CX04-0G
61	AOUT1	Output preset value 1	-	18	-
62	AOUT2	Output preset value 2	-	19	-
63	AOUT3	Output preset value 3	-	20	-
64	AOUT4	Output preset value 4	-	21	-
65	AOUT5	Output preset value 5	-	22	-
66	AOUT6	Output preset value 6	-	23	-
67	AOUT7	Output preset value 7	-	24	-
68	AOUT8	Output preset value 8	-	25	-

## □ I/O Parameters

Input/Output Type Parameters																	
Loops				Symbol	Description	F3CU04-0S F3CU04-0N F3CU04-0G				F3CU04-1S F3CU04-1N F3CU04-1G				F3CX04-0N F3CX04-0G			
1	2	3	4			Loops				Loops				Loops			
						1	2	3	4	1	2	3	4	1	2	3	4
141	341	541	741	OT	Control type selection	13	141	269	397	26	154	282	410				
142	342	542	742	IN	Input type selection	14	142	270	398	27	155	283	411	9	62	115	168
Input Range parameters																	
143	343	543	743	RH	Input range upper limit	15	143	271	399	28	156	284	412	10	63	116	169
144	344	544	744	RL	Input range lower limit	16	144	272	400	29	157	285	413	11	64	117	170
145	345	545	745	DEC.P	Decimal point position	17	145	273	401	30	158	286	414	12	65	118	171
146	346	546	746	SH	Scaling upper limit	18	146	274	402	31	159	287	415	13	66	119	172
147	347	547	747	SL	Scaling lower limit	19	147	275	403	32	160	288	416	14	67	120	173
148	348	548	748	SDP	Scaling decimal point position	20	148	276	404	33	161	289	417	15	68	121	174
149	349	549	749	RJC	Reference junction compensation	21	149	277	405	34	162	290	418	16	69	122	175
150	350	550	750	BSL	Burnout selection	22	150	278	406	35	163	291	419	17	70	123	176
Two-input Range Parameters (available only in two-input changeover mode)																	
151	351	551	751	PRH	PV range upper limit	23	151	279	407	36	164	292	420	18	71	124	177
152	352	552	752	PRL	PV range lower limit	24	152	280	408	37	165	293	421	19	72	125	178
153	353	553	753	PDP	PV range decimal point position	25	153	281	409	38	166	294	422	20	73	126	179

## □ Operation Parameters

SP-related Parameters																	
Loops				Symbol	Description	F3CU04-0S F3CU04-0N F3CU04-0G				F3CU04-1S F3CU04-1N F3CU04-1G				F3CX04-0N F3CX04-0G			
1	2	3	4			Loops				Loops				Loops			
						1	2	3	4	1	2	3	4	1	2	3	4
161	361	561	761	SELMD	Two-input changeover mode	26	154	282	410	39	167	295	423	21	74	127	180
162	362	562	762	SELH	Two-input changeover upper limit	27	155	283	411	40	168	296	424	22	75	128	181
163	363	563	763	SELL	Two-input changeover lower limit	28	156	284	412	41	169	297	425	23	76	129	182
164	364	564	764	SPH	Upper SP limit	29	157	285	413	42	170	298	426	-	-	-	-
165	365	565	765	SPL	Lower SP limit	30	158	286	414	43	171	299	427	-	-	-	-
166	366	566	766	SPR.UP	SP up gradient	31	159	287	415	44	172	300	428	-	-	-	-
167	367	567	767	SPR.DN	SP down gradient	32	160	288	416	45	173	301	429	-	-	-	-
168	368	568	768	SPR.TM	SP gradient time unit	33	161	289	417	46	174	302	430	-	-	-	-
169	369	569	769	SP.TR	SP tracking mode	34	162	290	418	47	175	303	431	-	-	-	-
PV-related Parameters																	
171	371	571	771	BS	Fixed bias	35	163	291	419	48	176	304	432	24	77	130	183
172	372	572	772	FL	Input filter	36	164	292	420	49	177	305	433	25	78	131	184
173	373	573	773	X1	Broken line input 1	37	165	293	421	50	178	306	434	26	79	132	185
174	374	574	774	Y1	Broken line bias 1	38	166	294	422	51	179	307	435	27	80	133	186
175	375	575	775	X2	Broken line input 2	39	167	295	423	52	180	308	436	28	81	134	187
176	376	576	776	Y2	Broken line bias 2	40	168	296	424	53	181	309	437	29	82	135	188
177	377	577	777	X3	Broken line input 3	41	169	297	425	54	182	310	438	30	83	136	189
178	378	578	778	Y3	Broken line bias 3	42	170	298	426	55	183	311	439	31	84	137	190
179	379	579	779	SR	Square root extraction	43	171	299	427	56	184	312	440	32	85	138	191
180	380	580	780	LC	Low-cut	44	172	300	428	57	185	313	441	33	86	139	192
Operation-related Parameters																	
181	381	581	781	SELF	Dynamic auto-tuning enable	45	173	301	429	58	186	314	442	-	-	-	-
182	382	582	782	SC	"Super" enable code	46	174	302	430	59	187	315	443	-	-	-	-
183	383	583	783	ARW	ARW setting	47	175	303	431	60	188	316	444	-	-	-	-
184	384	584	784	CMD	Control mode	48	176	304	432	61	189	317	445	-	-	-	-
185	385	585	785	ZONE	Zone PID selection	49	177	305	433	62	190	318	446	-	-	-	-
186	386	586	786	1RP	Reference point 1	50	178	306	434	63	191	319	447	-	-	-	-
187	387	587	787	2RP	Reference point 2	51	179	307	435	64	192	320	448	-	-	-	-
188	388	588	788	RHY	Zone switching hysteresis	52	180	308	436	65	193	321	449	-	-	-	-
189	389	589	789	RDV	Reference deviation	53	181	309	437	66	194	322	450	-	-	-	-
Output-related Parameters																	
191	391	591	791	CT	Cycle time	54	182	310	438	67	195	323	451	-	-	-	-
192	392	592	792	CTc	Cooling cycle time	55	183	311	439	68	196	324	452	-	-	-	-
193	393	593	793	MVR	Rate-of-change limit	56	184	312	440	69	197	325	453	-	-	-	-



PID/SP1 Parameters																	
Loops				Symbol	Description	F3CU04-0S F3CU04-0N F3CU04-0G				F3CU04-1S F3CU04-1N F3CU04-1G				F3CX04-0N F3CX04-0G			
1	2	3	4			Loops				Loops				Loops			
						1	2	3	4	1	2	3	4	1	2	3	4
201	401	601	801	1.SP	Set point (SP)	69	197	325	453	82	210	338	466	-	-	-	-
202	402	602	802	1.A1	Alarm 1 preset value	70	198	326	454	83	211	339	467	46	99	152	205
203	403	603	803	1.A2	Alarm 2 preset value	71	199	327	455	84	212	340	468	47	100	153	206
204	404	604	804	1.A3	Alarm 3 preset value	72	200	328	456	85	213	341	469	48	101	154	207
205	405	605	805	1.A4	Alarm 4 preset value	73	201	329	457	86	214	342	470	49	102	155	208
206	406	606	806	1.PB	Proportional band	74	202	330	458	87	215	343	471	-	-	-	-
207	407	607	807	1.TI	Integral time	75	203	331	459	88	216	344	472	-	-	-	-
208	408	608	808	1.TD	Derivative time	76	204	332	460	89	217	345	473	-	-	-	-
209	409	609	809	1.OH	Upper output limit	77	205	333	461	90	218	346	474	-	-	-	-
210	410	610	810	1.OL	Lower output limit	78	206	334	462	91	219	347	475	-	-	-	-
211	413	625	817	1.MR	Manual reset value	79	207	335	463	92	220	348	476	-	-	-	-
212	412	612	812	1.HYS	On/off control hysteresis	80	208	336	464	93	221	349	477	-	-	-	-
213	413	613	813	1.DR	Forward/reverse switch	81	209	337	465	94	222	350	478	-	-	-	-
214	414	614	814	1.GAIN.C	Cooling gain	82	210	338	466	95	223	351	479	-	-	-	-
215	415	615	815	1.HYS.C	Cooling on/off control hysteresis	83	211	339	467	96	224	352	480	-	-	-	-
216	416	616	816	1.DB	Dead band	84	212	340	468	97	225	353	481	-	-	-	-
				1.POUT	Preset output	85	213	341	469	98	226	354	482	-	-	-	-
217	417	617	817	1.POUT.C	Cooling preset output	86	214	342	470	99	227	355	483	-	-	-	-
PID/SP2 Parameters																	
221	421	621	821	2.SP	Set point (SP)	87	215	343	471	100	228	356	484	-	-	-	-
222	422	622	822	2.A1	Alarm 1 preset value	88	216	344	472	101	229	357	485	50	103	156	209
223	423	623	823	2.A2	Alarm 2 preset value	89	217	345	473	102	230	358	486	51	104	157	210
224	424	624	824	2.A3	Alarm 3 preset value	90	218	346	474	103	231	359	487	52	105	158	211
225	425	625	825	2.A4	Alarm 4 preset value	91	219	347	475	104	232	360	488	53	106	159	212
226	426	626	826	2.PB	Proportional band	92	220	348	476	105	233	361	489	-	-	-	-
227	427	627	827	2.TI	Integral time	93	221	349	477	106	234	362	490	-	-	-	-
228	428	628	828	2.TD	Derivative time	94	222	350	478	107	235	363	491	-	-	-	-
229	429	629	829	2.OH	Upper output limit	95	223	351	479	108	236	364	492	-	-	-	-
230	430	630	830	2.OL	Lower output limit	96	224	352	480	109	237	365	493	-	-	-	-
231	431	631	831	2.MR	Manual reset value	97	225	353	481	110	238	366	494	-	-	-	-
232	432	632	832	2.HYS	On/off control hysteresis	98	226	354	482	111	239	367	495	-	-	-	-
233	433	633	833	2.DR	Forward/reverse switch	99	227	355	483	112	240	368	496	-	-	-	-
234	434	634	834	2.GAIN.C	Cooling gain	100	228	356	484	113	241	369	497	-	-	-	-
235	435	635	835	2.HYS.C	Cooling on/off control hysteresis	101	229	357	485	114	242	370	498	-	-	-	-
236	436	636	836	2.DB	Dead band	102	230	358	486	115	243	371	499	-	-	-	-
237	437	637	837	2.POUT	Preset output	103	231	359	487	116	244	372	500	-	-	-	-
238	438	638	838	2.POUT.C	Cooling preset output	104	232	360	488	117	245	373	501	-	-	-	-

PID/SP3 Parameters																	
241	441	641	841	3.SP	Set point (SP)	105	233	361	489	118	246	374	502	-	-	-	-
242	442	642	842	3.A1	Alarm 1 preset value	106	234	362	490	119	247	375	503	54	107	160	213
243	443	643	843	3.A2	Alarm 2 preset value	107	235	363	491	120	248	376	504	55	108	161	214
244	444	644	844	3.A3	Alarm 3 preset value	108	236	364	492	121	249	377	505	56	109	162	215
245	445	645	845	3.A4	Alarm 4 preset value	109	237	365	493	122	250	378	506	57	110	163	216
246	446	646	846	3.PB	Proportional band	110	238	366	494	123	251	379	507	-	-	-	-
247	447	647	847	3.TI	Integral time	111	239	367	495	124	252	380	508	-	-	-	-
248	448	648	848	3.TD	Derivative time	112	240	368	496	125	253	381	509	-	-	-	-
249	449	649	849	3.OH	Upper output limit	113	241	369	497	126	254	382	510	-	-	-	-
250	450	650	850	3.OL	Lower output limit	114	242	370	498	127	255	383	511	-	-	-	-
251	451	651	851	3.MR	Manual reset value	115	243	371	499	128	256	384	512	-	-	-	-
252	452	652	852	3.HYS	On/off control hysteresis	116	244	372	500	129	257	385	513	-	-	-	-
253	453	653	853	3.DR	Forward/reverse switch	117	245	373	501	130	258	386	514	-	-	-	-
254	454	654	854	3.GAIN.C	Cooling gain	118	246	374	502	131	259	387	515	-	-	-	-
255	355	655	855	3.HYS.C	Cooling on/off control hysteresis	119	247	375	503	132	260	388	516	-	-	-	-
256	456	656	856	3.DB	Dead band	120	248	376	504	133	261	389	517	-	-	-	-
257	457	657	857	3.POUT	Preset output	121	249	377	505	134	262	390	518	-	-	-	-
258	458	658	858	3.POUT.C	Cooling preset output	122	250	378	506	135	263	391	519	-	-	-	-
PID/SP4 Parameters																	
261	461	661	861	4.SP	Set point (SP)	123	251	379	507	136	264	392	520	-	-	-	-
262	462	662	862	4.A1	Alarm 1 preset value	124	252	380	508	137	265	393	521	58	111	164	217
263	463	663	863	4.A2	Alarm 2 preset value	125	253	381	509	138	266	394	522	59	112	165	218
264	464	664	864	4.A3	Alarm 3 preset value	126	254	382	510	139	267	395	523	60	113	166	219
265	465	665	865	4.A4	Alarm 4 preset value	127	255	383	511	140	268	396	524	61	114	167	220
266	466	666	866	4.PB	Proportional band	128	256	384	512	141	269	397	525	-	-	-	-
267	467	667	867	4.TI	Integral time	129	257	385	513	142	270	398	526	-	-	-	-
268	468	668	868	4.TD	Derivative time	130	258	386	514	143	271	399	527	-	-	-	-
269	469	669	869	4.OH	Upper output limit	131	259	387	515	144	272	400	528	-	-	-	-
270	470	670	870	4.OL	Lower output limit	132	260	388	516	145	273	401	529	-	-	-	-
271	471	671	871	4.MR	Manual reset value	133	261	389	517	146	274	402	530	-	-	-	-
272	472	672	872	4.HYS	On/off control hysteresis	134	262	390	518	147	275	403	531	-	-	-	-
273	473	673	873	4.DR	Forward/reverse switch	135	263	391	519	148	276	404	532	-	-	-	-
274	474	674	874	4.GAIN.C	Cooling gain	136	264	392	520	149	277	405	533	-	-	-	-
275	475	675	875	4.HYS.C	Cooling on/off control hysteresis	137	265	393	521	150	278	406	534	-	-	-	-
276	476	676	876	4.DB	Dead band	138	266	394	522	151	279	407	535	-	-	-	-
277	477	677	877	4.POUT	Preset output	139	267	395	523	152	280	408	536	-	-	-	-
278	478	678	878	4.POUT.C	Cooling preset output	140	268	396	524	153	281	409	537	-	-	-	-
Alarm-related Parameters																	
281	481	681	881	AL1	Alarm 1 type	57	185	313	441	70	198	326	454	34	87	140	193
282	482	682	882	AL2	Alarm 2 type	58	186	314	442	71	199	327	455	35	88	141	194
283	483	683	883	AL3	Alarm 3 type	59	187	315	443	72	200	328	456	36	89	142	195
284	484	684	884	AL4	Alarm 4 type	60	188	316	444	73	201	329	457	37	90	143	196
285	485	685	885	HY1	Alarm 1 hysteresis	61	189	317	445	74	202	330	458	38	91	144	197
286	486	686	886	HY2	Alarm 2 hysteresis	62	190	318	446	75	203	331	459	39	92	145	198
287	487	687	887	HY3	Alarm 3 hysteresis	63	191	319	447	76	204	332	460	40	93	146	199
288	488	688	888	HY4	Alarm 4 hysteresis	64	192	320	448	77	205	333	461	41	94	147	200
289	489	689	889	DLY1	Alarm 1 ON delay	65	193	321	449	78	206	334	462	42	95	148	201
290	490	690	890	DLY2	Alarm 2 ON delay	66	194	322	450	79	207	335	463	43	96	149	202
291	491	691	891	DLY3	Alarm 3 ON delay	67	195	323	451	80	208	336	464	44	97	150	203
292	492	692	892	DLY4	Alarm 4 ON delay	68	196	324	452	81	209	337	465	45	98	151	204

# FA-M3 ToolBox for Temperature Control and Monitoring Modules

IM 34M06Q31-02E 6th Edition

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## ■ For Questions and More Information

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